RAILROAD GAZETTE

FRIDAY, MAY 4, 1894.

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Contributions.

Short or Long Smokeboxes.

PITTSBURGH, April 27.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The great diversity of opinion on the design and correct proportion of locomotive front ends, noted in your article on Locomotive Smokestacks of April 20, should not, in the interest of substantial improvement in locomotive design and effective and economical service, continue to prevail, when capable, as it is, of ready and conclusive solution by experimental research, on lines in which theory and practice indicate that correct general rules may be established, or, as you state it, "that within wide limits rules can be devised and applied with considerable success." If the Master Mechanics' Association Committee on Draught Appliances has been able to investigate, with a desirable degree of thoroughness, the important subject-matter committed to its charge, we may reasonably hope that its report will not only furnish interesting and valuable data, but also prove the entering wedge for an earnest and systematic effort on the part of builders and users of locomotives to produce a correctly designed and proportioned standard front end.

The essential features of a front end upon which opinions and practice differ widely are: first, smokebox length represented by an extended smokebox on the one hand and a

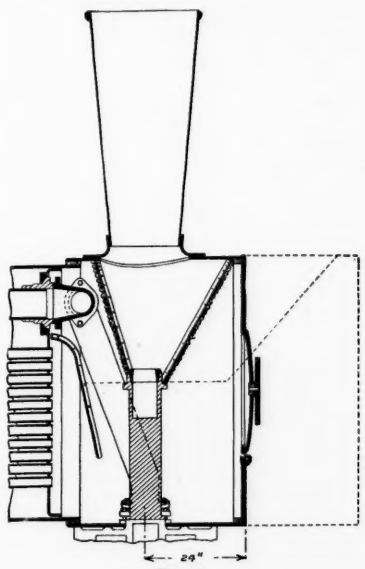


Fig. 1.

short front on the other; second, character of smokestack, represented by "diamond," "straight" and "taper;" third, exhaust nozzle, either single or double; and fourth, position of nozzles, either high or low. In these particulars, each representative element has its advocates and its opponents, and there do not appear to be any fixed or recognized rules, beyond the judgment of individual designers, either as to the form or proportions of the several elements of the front-end system, or as to their selection or rejection. Experiments, so far as reported, have been desultory and limited, and have been of but slight value, chiefly because the relative merits of compared appliances do not seem to have been investigated under otherwise similar conditions. Thus, a short smokebox does not necessarily involve the use of a diamond stack, nor an open stack require an extended smokebox, but the short and long fronts have been generally compared with relatively different stacks and spark-arresting appliances. The same independence of the length of the front exists as between low and high nozzles, but their comparison has usually been made under the conditions of a short smokebox in one case and a long one in the other. Again, the comparison between a taper and a straight stack, unless made with equal minimum diameters (as well as under equality of all other conditions), is manifestly valueless in the determination of their relative merit, but such equality of conditions in comparison does not appear to have been maintained in recent instances, in which taper stacks have been removed and straight ones substituted, as the taper stacks which were displaced were plainly, and were generally thought to be, several inches too wide in the throat, while the straight stacks which took their place are of about the same diameter as the throats of taper stacks which are and have been doing unquestionably good service on other lines.

So far as theory is supported by the results of practice, or unless controverted by them, it should govern in design, and if departed from at all, it should only be because demonstrated by practice to be incorrect. If, in the investigation of the proper construction of a locomotive front end, we proceed without regard to theoretical considerations, we should equally free ourselves from prejudice, force of habit and the influence of existing practice, the correctness of which is an essential object of inquiry.

Theoretically, and in accordance with well-recognized laws governing the flow of fluids and the action of ex-

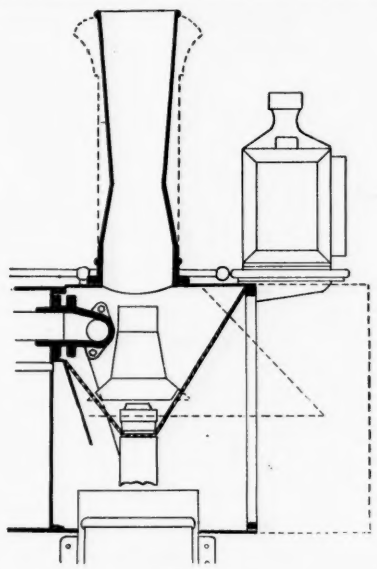


Fig. 2.

hausting devices, a reduction of smokebox volume will promote free steaming and relieve back pressure by permitting a reduction of the intensity of exhaust blast. Practically, an extension of the smokebox involves a large increase of smokebox volume, an increase of weight on the truck, inconvenience to trainmen working on front of engine and unsightly and unmechanical appearance of the front. The capability of carrying cinders is too small to be a factor, and is no longer urged; numerous existing instances demonstrate that all necessary netting can be carried in a short front, and those using the short front do their work with larger exhaust nozzles. The problem of correct smokebox length presents no unsurmountable difficulties, either theoretical or practical, and its solution, which is the most important element in the institution of a standard front end, would be an easy one by carefully conducted experiments, and would be of much value.

The taper stack is not denied to be the theoretically correct one under the same governing laws, and, so far as practical considerations are concerned, presents no feature whatever of objection or disadvantage, as compared with the straight stack. The question of diameter is the only one to be determined, and this being resolved by experiment, it would seem, unless theory is, in this particular, erroneous (which has not been claimed) that it should be followed, and that the taper stack should be an element of the standard front end.

The most advantageous number and position of exhaust nozzles would also seem to be determinable by thorough and carefully conducted experiment, although it is probable that in this regard standards could not be as closely approximated as in the case of smokeboxes and stacks. The importance of this, as well as all other details of the front end, is, however, so great, and so fully appreciated in intelligent and careful practice, that a standard front end may, in the near future, be an accomplished fact.

In line with the abandonment of the extended smokebox by the Union Pacific, and the resultant substantial advantages attained on that system in coal saving and reduction of fire damages and delays of trains by engines failing for steam, it is noticeable that the most recent and approved practice, on other roads which still retain the extension, is to shorten it considerably.

The accompanying front-end designs (neither of which is patented), each of which represents a modification of a construction in use to a considerable extent, are submitted in support of the writer's position that all the advantageous features (including ample netting capacity) of the extended smokebox construction, are obtainable with a short front. Fig. 1 shows, with the addition of the dotted lines, and the omission of the two sheets of netting in full lines, substantially the present standard extended smokebox construction. The modification, as shown in full lines, is practically that which, after experiments with extensions, has been adopted as standard on the Mexican Central, the smokebox being 24 in. from centre of exhaust to front. That road having recently adopted wood as fuel, the engines have been fitted with diamond stacks, the length of smokebox remaining as shown. It will be obvious on inspection that the area of netting is ample, and the rear sheet also has the advantage of avoiding joints around the steampipes.

Fig. 2 will be readily recognized as a modification of a well-known type used to some extent on Western roads, the peculiarity of which is a comparatively low nozzle, with lift pipe, and an inclined plate, running backward from the front of a horizontal sheet of netting to the stack, the netting, inclined plate and extension being shown in dotted lines. Omitting these, and using two inclined sheets of netting, as in full lines, all the remaining features are retained (except a slight change in the lower end of the lift pipe, which can be avoided by bending the netting to clear it), and there is not only an abundant area of netting, but almost as much as in the original construction.

J. SNOWDEN BELL.

SPRINGFIELD, ILL., April 11.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have carefully noted what you have to say regarding smokebox matters, also a recent article in the "National Car Builder" by Mr. J. Snowden Bell, and I enclose you herewith a blue print, showing the application of our extension front. *D* (Fig. 3) is a solid deflector plate in front of the flues; this plate is held in position to the flue sheet by an angle iron. The deflector plate should be made of 3-16-in. common iron in two sections, fitted to the sides of the smokearch, with a butt joint in the middle. It is strengthened by a 2 x 2 x 5-16-in. angle iron across the face, to which is bolted the perforated plate. *E* shows a perforated plate of No. 8 iron; the perforations to be 1-4 x 1 1-4 in. staggered, with 1-4-in. bridges, and lengthways of smokebox arch. This plate is bolted to the angle iron on smokearch and deflector with a lap joint in the centre. *F* is the front deflector plate made of ⅛-in. common iron in two sections, fitted to sides of smokearch, with a butt joint in the middle. This plate is bolted to angle irons on sides of smokearch and is stayed by an angle iron

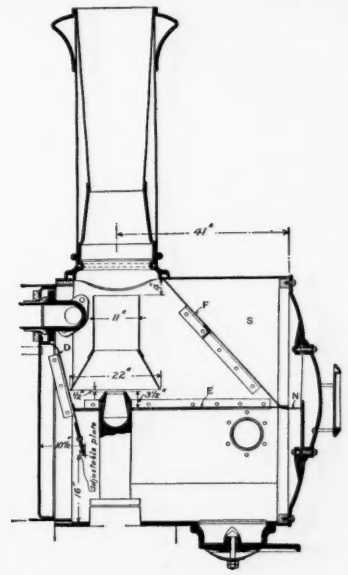


Fig. 3.

across the lower face. The lower edge of plate is flanged as shown. *N* is a plate of 3-16-in. common iron. This plate is fitted to the boiler front and door to prevent the action of the exhaust on the space *S*. This plate, the perforated plate *E* and deflector *F* are all firmly bolted together.

I have found that, after an engine has run a few miles, the lower front part of the smokebox fills with sparks until a space about equal to the space *S* is filled, after which the further accumulation of sparks is very slow, the major portion going out through the stack, until the end of the run, when the space below the perforated plate will be found well filled. I am satisfied that having this bank of cinders or sparks in the front end is a benefit, inasmuch as it helps to break up and deaden any subsequent sparks that may come through the flues. My reason for thinking this is, we have tried placing a plate on the front end, making it concave, so as to shut off the same space as the sparks usually occupy; when this was done, the perforated plate, in front, was cut away very rapidly and there was no accumulation of sparks.

We are using 4½ "single nozzles in our 18 x 24" engines, which is larger than the nozzles formerly used without the extension fronts. I am of the opinion that the first cost, facilities and cost of repairs and general outside appearance should be taken into consideration.

J. B. BARNES,
S. M. P. & M.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The theory advanced by Mr. J. Snowden Bell suits my mind exactly. I think I have collected proof enough to show that a long smokebox has no advantage except where it is intended to use a very fine netting, not coarser than

four meshes per inch, No. 12 wire, and retain all of the cinders in the smokebox. This can only be done on exceedingly short runs, where the engine is not pushed very hard. For regular work it is impossible to provide sufficient capacity in smokeboxes and also impossible to get enough draught for heavy work when a large box and a fine netting are used.

I am satisfied that the long smokebox decreases very largely the effect of the exhaust nozzle, thus it reduces the vacuum, and a smaller nozzle is necessary with the extension front than without it. I have made some investigations in view of the fact that I am on a local committee on smokebox apparatus and I find that it is probable that the lower the exhaust tip the larger it may be, and that when the nozzle is somewhat below the center of the boiler it can be made very large. In fact two railroad men tell me that with low nozzles they have found that if the tip is very large the draught is too great, and in some cases they have had to reduce the nozzle in order to reduce the draught. This seems like a paradox, but these men assure me that they have found this to be the case in several instances. Mr. Bell has got the right idea in arranging smokebox deflectors and netting. In fact, I think the double perforated deflector will probably kill most of the sparks before they reach the netting, especially if the holes in the deflector are so large as to allow much of the gases to go through the deflector instead of under it.

DEFLECTOR.

Electricity in Heavy Railroad Service.

BROOKLYN, April 30.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have read with great interest the careful and conservative article on "Electricity in Heavy Railroad Service" in your issue of last week. So much intelligent effort is being applied to the problem of electric traction that we must ere long have some satisfactory results, at least for the elevated railroads. As far as these lines are concerned much has been already settled. The main reason why they cannot afford to make the change from steam to electricity is not alone the cost of central stations and conductors, but the expense of throwing away the present locomotives and plant connected therewith. With the multiplication of large electric stations in our great cities, power may soon be borrowed or hiredfor the experimental instalment of electric service on elevated lines.

The points almost, if not quite settled, for elevated service are these: (A) that electricity will be cleaner and less noisy than steam; (B) that the acceleration in starting will be greater, and hence that average speed may be greatly increased, even if the maximum speed is not.

The Liverpool Overhead and the Intermural railroads demonstrated the practicability and necessity of using motor cars instead of independent locomotives with a corresponding gain in switching and light engine mileage, and in train expenses. Two cars to a train, require two men only in running; four cars in two trains, instead of one, give greater frequency of trains and the cost of wages is reduced in the proportion of about 10 to 7.

I can scarcely conceive a simpler or more effective collecting device than that used at Liverpool; the greater size of the conductor makes it safer even if more exposed than the trolley wire, while the collector itself is nearly perfect, even for high speeds, of say 30 to 40 miles an hour.

It still remains to show that electricity is as economical as steam propulsion; if it even is nearly so, there only remains the objection which applies with equal or greater force to cable propulsion, that you have your power at the end of a string which may break.

Greater economy must be conceded as yet to steam, but there are so many expenses and inconveniences in cities, other than the simple cost of power, most of which will be better satisfied by the use of electricity, that the latter must come for elevated railroad propulsion and that soon.

CONSERVATIVE.

Condensation in Engine Cylinders.

At the last annual meeting of the Institute of Naval Architects, British, a paper was read by Mr. D. Croll on "Some Experiments with Triple Expansion Engines at Reduced Powers," the deductions from which experiments must be as interesting to the builder and operator of the locomotive engine as to the designer of stationary engines. The results of the experiments here given were not the direct object of the tests. The experiments were made with a triple expansion engine having cylinders 13½, 21 and 35 1-4 in. in diameter and 21 in. stroke of piston.

The calculations made at various points, during expansion through the three cylinders, of the percentage of feed-water unaccounted for by the indicator, showed enormous losses which could only be accounted for by condensation and re-evaporation in the cylinders. The reason presented for this was that the film of water, which is deposited on the piston head and interior walls of the cylinder, is of such infinitesimal thickness that the nature or condition of the surfaces with which the steam comes in contact may affect very materially the amount of the condensation. The experience of Mr. Croll and his engineering friends was that engines with cast steel cylinder heads and pistons were troubled more with water in the cylinders than the engines with cast iron parts; in cases where cast steel had been used in pistons and heads it had been impossible to get diagrams from the engine. The explanation of this was that cast steel, being more porous than cast iron, presents a greater area of cooling surface to the steam.

An experiment to prove that the rougher the surface presented the greater would be the condensation and re-evaporation, was made. A cast iron cup was turned to a thickness of about ⅛ in.; one-half of the outside surface was polished and the other half left as it came from the sand. The cup was filled with water at a temperature of about 170 degrees F., and a jet of steam directed against the outer surface. The time required for the surfaces to become dry after the jet of steam was shut off was noted; for the rough surface the time was 43 seconds, and for the polished surface 83 seconds.

This means that a rough surface will condense more steam, or re-evaporate more water, in a given time than will a smooth surface, the difference in amounts depending on the difference in the conditions of the surfaces. The application of this is that all surfaces with which the steam comes in contact should be as smooth and brightly polished as possible. A further saving might be shown by filling even the small holes in the polished surface with graphite or other bad conductor of heat that would withstand the wear and the high temperature. The use of graphite for such purpose has been advocated by Professor Thurston for some years and a patent was granted on the process of coating the walls of engine cylinders.

A High-Speed Electric Locomotive.

The accompanying illustrations show the general form and construction of an electric locomotive now being built by the Paris, Lyons & Mediterranean Railroad after the designs of Mr. H. Bonneau, Chief Engineer of the road, and Mr. E. Desroziers, for trial in fast passenger service.

The locomotive has four driving wheels, a four-wheel leading truck and a two-wheel trailing truck, the drivers and trailing truck being so mounted as to form a rigid wheel base of 15 ft. 7 in. supporting the frame by half elliptic springs. The springs of the trailing truck are placed above the boxes, while the driver springs are underhung and equalized. The leading truck is so mounted as to have a considerable range of lateral motion and is held normally in a central position by means of springs. In order to gain the necessary amount of space for the driving mechanism, the frames, which are of plate construction, are placed outside the drivers.

The motors are slow-speed, six-pole machines of the Desroziers pattern, a motor being mounted on each axle. The armature shafts are hollow, their internal diameter being sufficient to give considerable clearance to the driving axles which they surround. It will be observed tha the commutator of this motor is close to the armature and surrounded by the pole pieces. It is claimed that this construction permits the use of a more powerful motor than would otherwise be possible in the limited space between the drivers. The brushes are easily reached, through the openings between the pole pieces. The field magnets are supported by heavy lugs on the motor frames bearing on vertical rods, the heads of which are so shaped as to permit a slight lateral motion of the motors. These rods are supported on U-shaped girders fastened at the upper ends to the frames, but are provided with buffers of Belleville washers in order that shocks may not be transmitted vertically from the frames to the motor. The motor is thus supported clear of the axle and transmits motion to the drivers through the system of drag links shown in figs. 2 and 3. A double plate ring surrounds the axle and is connected to it by means of two short rods or links placed diametrically opposite to one another. Two similar rods perpendicular to the first connect this ring with the driver.

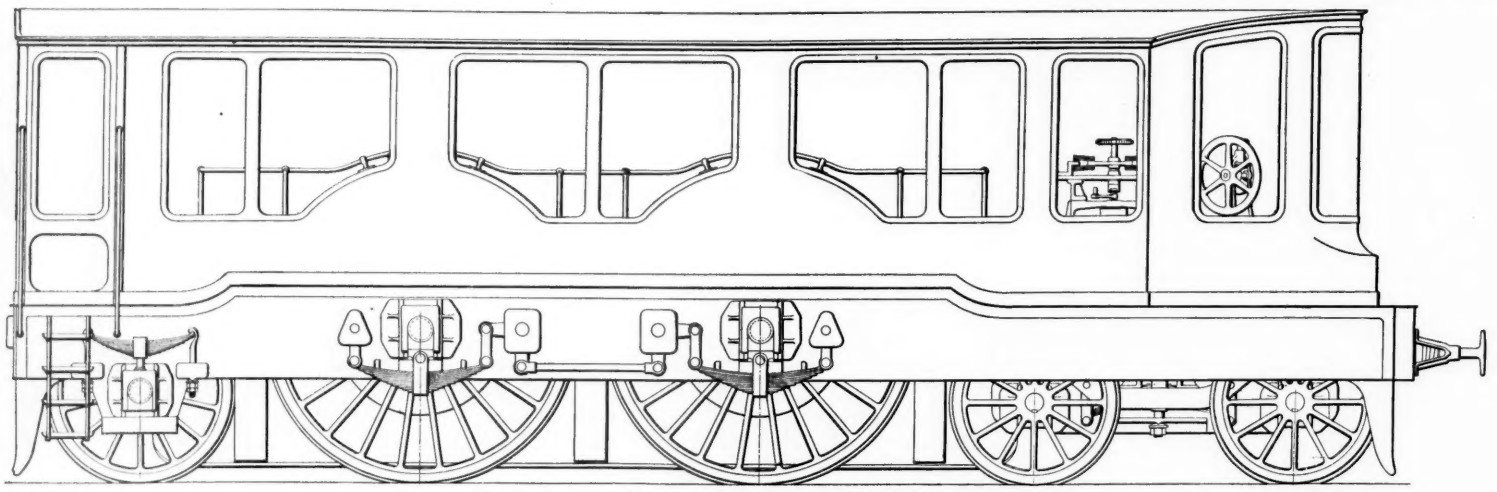


Fig. 1—Bonneau & Desvozierjs High Speed Electric Locomotive.

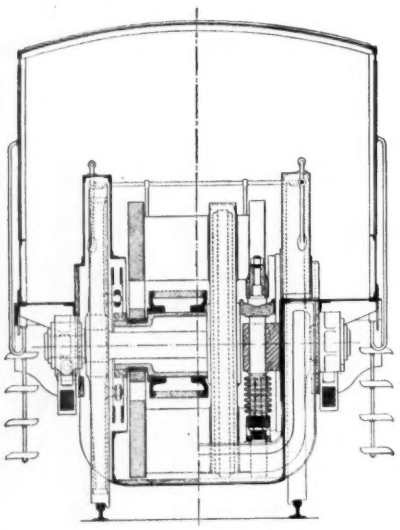


Fig. 2.

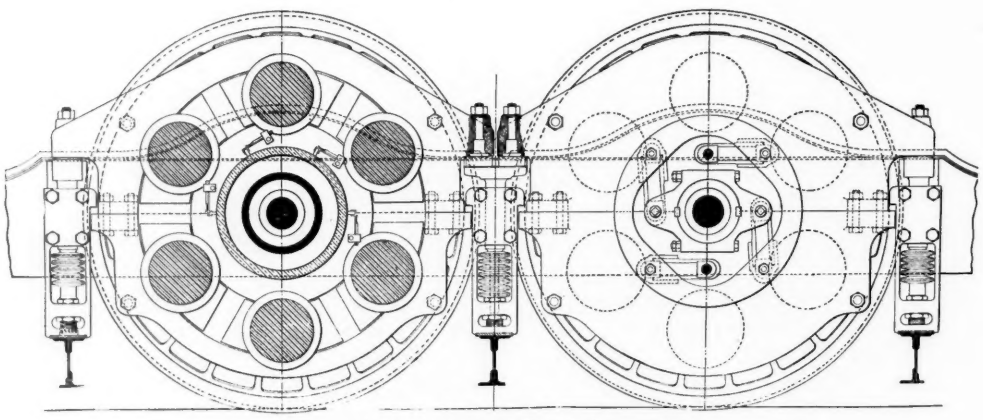


Fig. 3—High Speed Electric Locomotive.

In order to give this connection the greatest possible freedom of motion, ball bearings are provided at the ends of each rod.

Beneath the motors and secured to the U-shaped girders is a casing of sheet iron and wood of sufficient length to protect both motors from dirt and moisture and carried up to the frame at the sides and ends. The upper part of the dynamo is left uncovered with the exception of the armature, which has a light iron casing.

A light cab covers the whole locomotive, thus completely protecting the motors and apparatus.

In order to avoid, if possible, the necessity of stringing conductors along the road, especially for branch lines, the company will at first experiment with storage batteries, and has made arrangements for carrying them over the leading truck of the locomotive. The necessary apparatus for controlling the supply of current and for the application of brakes is placed also at the front of the locomotive, where the engineer will have an unobstructed view of the track ahead.

The general dimensions and weights of this locomotive are as follows:

Driving wheel base	8 ft. 6⅛ in.
Rigid wheel base	15 ft. 7 in.
Length over buffers	37 ft. 1⅝ in.
Diameter of drivers	7 ft. 8½ in.
Diameter of trailing truck wheels	4 ft. 7⅛ in.
Diameter of leading truck wheels	4 ft. 1¼ in.
Weight on drivers	63,933 lbs.
Weight on leading truck	28,660 lbs.
Weight on trailing truck	44,092 lbs.
Weight of frame and accessories	70,548 lbs.
Weight of motors	55,115 lbs.
Weight of apparatus	2,204 lbs.
Weight of storage batteries	8,818 lbs.
Total weight	156,685 lbs.

It is calculated that the locomotive above illustrated will have a maximum power of 1,200 H. P. The first locomotive is to have a power of only about 300 H. P.

Track.

Last March Mr. L. F. Loree, Superintendent of the Cleveland & Pittsburgh Division of the Pennsylvania Lines West of Pittsburgh, read before the students of the University of Wisconsin a paper on the comprehensive subject of "Track." He gave a sketch of the origin and growth of the railroad in general, and then, under the specific head of Track, "he considered his subject under the subdivisions of sleepers, rails, fastenings and joints. Each of these topics he first took up somewhat historically, and then gave a short account of the present state of the art. While the paper is very interesting in all its parts and quite worth putting in permanent and accessible form, we can take space in the *Railroad Gazette* for but a few extracts from it.

Under the head of "Sleeper," Mr. Loree says these fail under two influences: first, those incident to time and weather, as checking under the heat of the sun and decay; second, those incident to traffic, as the compression of the fibers of the wood, hammering by the rail and the penetration of particles of ballast. Chemical treatment is the obvious preventative of the first kind of failure, and Mr. Loree called the attention of his hearers to the admirable report on this subject presented to the American Society of Civil Engineers in July, 1885, which is the best document on this subject yet produced in the English language. Abroad, timber is nearly always treated in some way before being used for crossties. The number of treated ties in use on the state railroads of Prussia in 1889 was 78 per cent. of the whole, but in this country treated ties have been used extensively on but two railroads. The Chicago, Rock Island & Pacific, which has been using them since 1886, had at the end of 1892, 1,735,416 treated ties in the track; the Atchison, Topeka & Santa Fe, in the same period, put in 1,372,070.

Against the second cause of failure the tieplate seems to be the only protection. In England the cast iron chair takes the place of a tieplate. On the continent tieplates of various forms and dimensions have been very largely used, and the plate recently adopted by the Royal Prussian State Railroads, after experimenting with several forms of teeth and ribs, has a flat under surface. Mr. Loree's observations, however, lead him to the conclusion that a tieplate having ribs its full length, in the direction of the fiber of the wood, seems to secure a practical identity of the plate with the tie after it has been fastened in place.

In treatingthe topic of "Rails," Mr. Loree mentions a historical fact which, although well known to many persons, should be repeated from time to time in order that it may not be forgotten. He says the first flange rail was designed by Robert L. Stevens, President of the Camden & Amboy Railroad, and was rolled in 1830 by Messrs. Guest, of the Dowlais Iron Works, of Cardiff, Wales, who shipped some 500 rails 18 ft. long, weighing 36 lbs. to the yard, to Philadelphia in 1830. While this type of rail is known in England and on the continent as the Vignoles, from the name of the engineer who first introduced it there, the evidence in support of the claim of Stevens as its inventor is conclusive.

The chief faults of the steel rail as now used are the quality of material and the process of manufacture. The commercial service of a rail, that is, the tonnage passed over it, is very difficult to get, and the life of a rail must generally be roughly expressed in years of service. In the early days of iron rails they lasted 20 to 25 years, but in 1873, with the deterioration of the quality of the rails and increase in tonnage, they were wearing out on the Pennsylvania Lines in from six months to two years. It looked then as though the railroad system was about to break down under the increase of the traffic which it had itself largely created. Then came Bessemer's discoveries and inventions, and the steel rail gradually came into use, and now we are gradually repeating with the steel rail the first experience with the iron rail. There is an enormous increase in the load imposed until the head of the rail has now to support 90,000 lbs. per square inch pressure, and there has also been a deterioration in the quality of the material, due largely to rapid working, and rails are wearing out now in from 3 to 12 years.

Mr. Loree considers at some length the various efforts to produce a compound rail and examines the recent Haarmann-Vietor "Hercules" rail designed to be self-supported, which was described in the *Railroad Gazette* of Nov. 3, 1893, but against all the advantages obtainable by this rail are the large expense of preparing the roadbed and ballast for proper drainage, and the rapid wear of the railhead, which would compel the replacing of the entire track structure at frequent intervals.

In the matter of joints, Mr. Loree concludes that we shall have to deal in the future with the angle bar joint. Of this he says that, while the suspended joint is the more elastic and gives the easier riding, the supported joint is still in considerable use. With this form of joint, as the joint tie sinks the bridge becomes too long and weak for the load and the bar breaks in the lower edge, the invitation to do so promptly having been extended by slotting the bar for spiking. When these long bars are tightly bolted they grip the rail so firmly as to prevent movement in contraction and expansion, the result being buckling of the angle bars, and in contraction it not infrequently happens that the bars are torn asunder. The use of the long angle bar is, in consequence of these defects, being abandoned.

While considering the subject of joints Mr. Loree takes up the nut lock, the principal types of which he describes, and this topic he closes by saying that on the continent of Europe these appliances are going out of use, it having been found that by flattening the pitch of the thread of the bolt, making twice as many threads to the inch as formerly, the tendency of a nut to work loose is overcome. The ordinary attention of the track walker is sufficient to take up the wear by an occasional turn of the nut.

What follows is quoted literally from Mr. Loree's paper.

What then of the future, always equally interesting with the past and of infinitely more importance? As Mr. Haarmann has pointed out, "the comfort and speed of traveling, as well as the economy and safety of working, depend chiefly on the correct construction of the permanent way." Now it is to be observed that this structure of the track is extremely flexible and so weak as to be utterly incapable in itself of resisting the tremendous strains and shocks to which it is subjected. That we depend, for example, for the stability of the rail not alone upon the fastenings by which it is secured to the ties, but upon the application of the force of gravity in the load rolling upon it. That the rails are maintained in their parallel and relative position not alone by the permanent connection through the crossties, but by their temporary connection through the axle of the loaded wheels. That this structure surges and sways under this service and is preserved from total destruction not by reason of the adequacy of its own strength, but by reason of the coherence imparted to it through the very load under which it is struggling.

The problem confronting us, then, is not the construction of a perfectly rigid and inelastic structure, for that would be at once battered to pieces by the traffic, but rather the confinement of the movements generated by that traffic to the smallest possible space, and particularly their prompt arrest, in order to avoid that cumulative effect which is the powerful cause of the destruction of the track.

For that reason the crossties should be of such form as to be firmly held up and secured by the ballast which surrounds them, and the disposition of the rail to cut into their surface to make room for a vertical movement should be resisted.

For that reason the rail itself should be made heavier, and particularlyshould it be made deeper, since its strength varies nearly as the cube of its depth.

For that reason the fastenings should be improved in form and increased in number.

For that reason the joints should be greatly strengthened, these being in the very nature of the case and in spite of the vast labors which have been expended upon them the weakest spots in the structure. Well do they deserve the characterization applied to them by Haarmann, "the bacilli of the track" working incessantly to its destruction.

Let us examine, then, what we may reasonably expect of the near future as to the development of these parts.

Against the disintegrating effect of time and the weather the chemical treatment of the crosstie will prolong its life through twice the space of its present existence, and will enable us to substitute for white oak much less expensive woods. Against the abrading action of the rail moving under the traffic we may interpose the protection of a tieplate, the flanges of which imbedding themselves into the wood in the direction of its fibre will become an integral part of it, and which will be as effective in protecting the crosstie from the one source of destruction as the chemical treatment will be in protecting it against the other.

The rail increased in height and weight will be improved in the material not perhaps by a return to cold finishing, but either by making the steel lower in carbon, say .20 or .25 instead of .35 and .40, and then tempering while at a dead red heat in oil by a proper arrangement of the cooling table (this method would probably not add to the cost of production), or by the substitution of nickel steel, now used so extensively for armor plate. Rails of this last material can be furnished at $70.00 per ton or about what we were paying for iron when we abandoned the use of that material. The increase in price over the steel rail in use is less than the increase we were compelled to pay in changing from iron to steel. I think there can be no question of the advisability of beginning at once the use of this material in such places as the curves on the New York Elevated railroad, where the steel rails have to be renewed every two or three years, and at many points where the service is equally severe.

We shall probably continue for fastenings the use of the hook-headed spike, but more should be used along the inner edge of the rail, since the effect of the forces acting upon the head of the rail is to turn it over on its outer flange. The application of the tieplate will double the effect of the spikes, since it compels their acting together.

The joint I think we may look to see developed along the lines of the Haarmann-Vietor scarf joint, adding greatly to its strength both against the vertical and lateral strains. But the most profitable field for present economy in this particular lies in the lengthening of the rail and the consequent reduction in the number of joints. At the present time a heavy proportion of the rails purchased by the Pennsylvania Lines are 33 ft. in length, thus reducing the number of joints by 10 per cent., while a very considerable tonnage has been purchased of 60-ft. lengths, with which extensive experiments are being made. I think we may look with confidence to the adoption of this length as a standard, and if the scarf joint prove a success in solving the difficulties of expansion and contraction the lengths are likely to be still greater.

Device for Squaring Locomotive Frames.

Our illustration shows the form and construction of a device used in shops of the Wisconsin Central Lines at Waukesha for squaring up engine frames. It consists of a double T-square and straight edge and is provided with such means of adjustment as to make it applicable to any ordinary size of locomotive. The straight edge or body of the device is of steel and is secured to the brackets shown in Fig. 2, by hand bolts passing through holes slotted lengthwise in the straight edge to provide for lateral adjustment. The blades are riveted to the T-heads and are secured in any desired position by the hand screw, which also pass through slotted holes in the body. The edges of the straight edge are leveled at each end and draw against corresponding leveled surfaces on the T-head, thus securing an accurate adjustment at any point.

The bracket upon which the device is clamped is of cast iron and provided with a T-slot on its upper surface, in which is carried the head of the bolt by which the straight edge is held in position. A steel tube is pressed into a projecting boss on this bracket, the outer end of the tube being threaded internally for a short distance to receive a ¾-in. screw and counterboard for the remainder of the

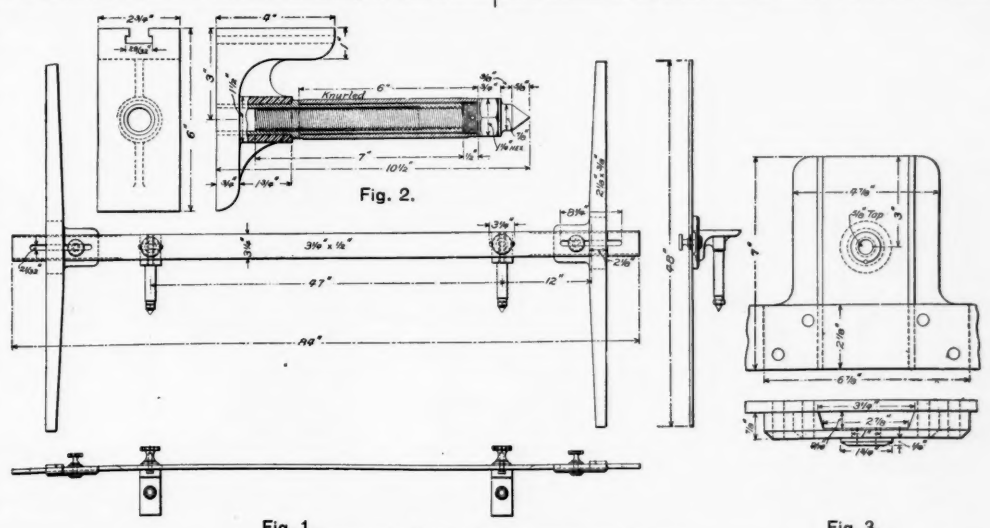


Fig. 2.

Fig. 1.

Locomotive Frame Straightedge and Square.

Fig. 3.

distance to a sufficient size to receive the body of the screw. On the head of this screw is a center. The body of the screw is protected by a knurled sleeve screwed to the under part of the head.

In applying the device to engine frames the brackets are secured against the shoe faces by screwing out the centers against the wedge faces. The straight edge is then placed upon the brackets and secured by hand bolts, after which the heads are placed in position and set to the cylinder lines. The slots in the brackets permit the adjustment of one blade parallel to the cylinder line, after which the parallelism of the other line can be determined. Working lines on the frames are laid out from the straight edge.

This tool has been found very useful in building and repairing locomotives, as it insures an accuracy not attainable with the tools generally used.

Cleaning and Oiling Triple Valves and Brake Cylinders.*

Care of the Triple Valve.—The triple valve should be cleaned at least once every three months. In some few cases the opinion has been expressed that they should be cleased oftener. In cleaning no waste should be used, as it is liable to leave lint on the parts and cause infinite trouble. A mineral oil should be used and the parts wiped perfectly clean with rags. A suggestion that will give excellent results is, to use the light oil for cleaning purposes on a sponge, and for wiping dry use a chamios skin. This effectually prevents all danger from lint. The packing ring should be known to work freely in the groove in the piston, and the feed groove should be carefully cleaned. The groove in the back of the piston should also be cleaned. The slide and graduating valves should be perfectly clean and the graduatng pin should be seen to be in position and fastened securely. It is a good plan in cleaning, after the dirt has been removed, to place the piston and valve back in its place, and notice the fit of the packing ring in the cylinder. This should be a close fit, should the ring gap open more than 3-64. in after the piston is in place, it should be sent to the shop for a new ring. In fitting packing rings in triple valve pistons, they should be fitted to as near an air-tight joint all the way round as possible. The ends of the ring should come as close together as is consistent with free working. This fitting should be accomplished by scraping, doing as little grinding as possible, and when properly fitted a few rubs should bring the ring to a proper bearing. It is also a good plan, at the time that the piston and valve are replaced, to notice the amount of wear that has taken place on the slide valve and its seat. In oiling the triple, before replacing it finally, a few drops of oil should be worked in around the packing ring in the piston so as to make it work freely in the groove. A drop or two of oil should be placed on the slide valve and seat, and one or two drops put in the cylinder in which the piston moves, not using more than eight or ten drops of oil on the entire valve. The quality should be one that will not gum readily, and on that account a mineral oil is preferable to an animal oil. In cleaning triple valves, should the gasket (11 in the plain triple or 23 in quick action) require renewal, it should always be replaced by a leather gasket and never rubber.

Care of the Quick-Action Triple.—Especial emphasis should be placed upon the amount of oil used. No oil should be used in the quick-action parts, as they require to be kept as dry as possible. Should too much oil be used in the triple, or oil be used in the quick action parts, it will rapidly disintegrate the rubber seat on emergency valve 10. In cleaning this part of the triple, care should be exercised in taking the valve apart not to spring emergency valve seat 9, as a careless workman might put a chisel or bar in the opening provided for the emergency valve, in order to pry away the seat from the gasket, and by so doing spring the seat out of true, thus causing the valve to leak. A thin-edged chisel should be used to wedge the valve seat away from the gasket 14. A device for this purpose that has given good results, is a pair of tongs, similar to those used to remove air-valve cages, slipped through the central opening. The stem of the emergency valve should be known to be straight, and if bent should either be straightened or a new valve substituted. The seat of this valve should be good and if badly worn should be replaced by a new one. Check valve 15 should have a good seat and be cleaned, the plug 26 should be removed, and all the particles of dirt removed from chamber in check-valve case 13, as it is liable to find its way up to the emergency valve 10 and check valve 15, thus causing trouble. The graduating stem 21 and spring 22 should be known to work freely.

Troubles with the Plain Triple.—Quite a frequent complaint is, that the triple sticks, more especially in tender brakes. The Committee holds that, leaving ice out of the question, it is practically impossible to make a triple stick. Air pressure, like all others, is measured at so many pounds per square inch of surface, and when the area of a triple valve piston is considered, and the great total difference with a slight variation of pressures, it will be readily seen why this is so. The cause of tender brakes refusing to release, in the majority of cases, is too large an auxiliary reservoir for the size of the cylinder, a 12 in. by 33 in. auxiliary being used with an 8 in. brake cylinder. As a rule the tender and driver triples receive less attention than any other triple valves in service. The tender triple should be drained frequently, as it will collect more moisture than any other triple in the train. In cleaning these, should any be found with the centre feed arrangement, they should be taken off and replaced by the overhead feed. With the plain triple especially should special attention be given to the wear of the slide valve, as if it is badly worn it is liable to form a shoulder on the side of the seat, and also wear so much as to prevent the spring 18 from pressing the slide valve firmly to its seat. Another feature on this point is the liability of the slide valve by extreme wear to reduce the exhaust opening, and thus partially retard the exhaust, causing the whistling sound so much admired by trainmen. Leaky triples can be located as follows: First, one that blows out of the exhaust and is stopped by a tap of the hammer; either the slide valve is badly worn or else dirt or some foreign substance has lodged between the valve and seat. Should the blow not stop by tapping it, and the slide valve have a good seat, the trouble is in the fourway cock. The feed groove being partly closed from gum or any foreign substance, would prevent that car charging as rapidly as it should. Loose or badly worn packing rings would have a contrary effect and also cause the car having them to be very slow in applying and difficult to release. This causes brakes to stick. But it must be remembered, that if the pressure in the train pipe can be raised above the auxiliary reservoir pressure, that the triple does not stick, and the only reason for the brake refusing to release in this case is the fact that the train pipe pressure could not be so increased. The graduating pin being broken off in the plain passenger triple would not produce any noticeable effect, but in the plain freight triple this would prevent the application of the brake.

Troubles with the Quick-Action Triple.—All that has been said about the plain triple is equally applicable to the quick action, except in reference to the graduating pin being broken, which subject will be taken up later. The service application or graduating ports require attention, as they are liable to gum up, from inferior oil or too large a quantity of it. Care should be taken to have the graduating spring and stem clean, that no extra resistance may be exerted against it. In the quick-action part of the triple, attention should be given to the emergency valve 10, and in replacing the rubber seat of this valve, only the seats prepared for the purpose should be used; sheet gum or leather should never be used on this valve, as both become too hard and dirt lodging on the seat causes a blow from the exhaust. In replacing the rubber seats on the emergency valve, care should be exercised that the stem of the valve is not strained or twisted off in attempting to get the dowel pin back in its place, which latter should be put back by all means.

In case of leaking from the exhaust port of the quick-action triple it can be located as follows: either the emergency valve leaking, the slide valve leaking or the gasket leaking between the triple and cylinder. To locate the leak, have the car fully charged up and then close the cut-out cock in the pipe. branch If after doing this the brake applies and the leaking stops, the trouble lies in all probability in the emergency valve. Should the brake not apply, cut the car in and have the brake applied in the service application, and if the leaking stops, the trouble probably lies in the gasket; if it does not stop, it must lie in the slide valve. In this part of the triple will be noticed the effects of too much oil in either the triple or brake cylinder, or improper oiling of either. Too much oil in either will rapidly injure the rubber seat on emergency valve 10, and a number of cases have been found where leather had been substituted for the rubber seat on that account. The trouble with leather has been mentioned before; it is too hard. Should anything cause the emergency valve and check valve to stick together, or the emergency piston to stick down, a peculiar trouble would originate; the brake would refuse to release, while at the same time there would be a tremendous blowout of the exhaust opening. This triple would work all right in the service application of the brakes, but if quick action was obtained, and the above-named valves were to stick together, the result as above would ensue. In regard to the effect of a broken graduating pin in the quick-action triple, quick action would be obtained after about an eight or ten pound reduction in the train pipe pressure, in the service application, so that it is essential that this pin should be in good order before returning the triple to its place. The Committee takes pleasure in reporting that the number of graduating pins found broken is noticeably smaller than heretofore; in fact, it may be said to be a rare occurrence to find them.

Care of Brake Cylinders.—There is no part of the brake apparatus so apt to be slighted as the brake cylinder. No matter how much care is bestowed upon the adjustment of piston travel, or the leverage of the car, if the cylinder does not receive proper attention, poor braking will result. Brake cylinders should be cleaned and oiled regularly, and not be flooded with oil for awhile and then allowed to run for a long time. A custom still in vogue in some parts of the country is to oil the brake cylinder (or try to) by pouring oil into the hose and blowing it into the cylinder. This practice must be discouraged by all means, as it is of no service in the maintenance of the brake, but on the contrary is injurious to all parts. What oil goes through the pipe carries dirt and scale with it, and soon clogs up the strainer in the drain cup, and if any passes this point it only serves to clog up the strainer in the triple valve, and if a sufficient quantity is put in to pass this last obstruction it is injurious to the triple valve, as it passes into the bottom of the triple and first passes and injures the emergency valve. The majority hold that a cylinder should run six months after being cleaned. The minority suggest various times from one month up. A freight car lent may not return for an indefinite period. It would be well to bear this in mind and not let a car go the full six months, if an opportunity is afforded to clean it when nearing the limit. All agree that where the cylinder is allowed to run for six months before cleaning, it should be oiled at the expiration of three months, through the plug provided for the purpose, and at this time the piston should be turned half over in the cylinder.

The only easy method of cleaning is to remove the back head, and after removing the piston, clean the clyinder with a mineral oil on a rag, the advice concerning the use of waste in cleaning triples being equally applicable here. A sponge and chamois skin give the best results. The leakage groove should be cleaned out thoroughly, using a small nail, the piston thoroughly cleaned and the nuts on the follower plate seen to be tight. The expander ring or packing expander should fit the cylinder nicely when removed from the piston, so that when replaced it may exert a pressure against the packing leather. In putting in new packing leathers, care should be exercised to have them so placed that the rough side of the leather will be next the cylinder when the piston is in place. An impression is prevalent that the smooth or hair side of the leather should be next the cylinder; this is wrong, as the rough side makes much the better joint. Oil-tanned leather only should be used for brake cylinders of any description, and should not need forming until put in place on the piston. By working it a little, it will then be sufficiently soft to readily conform itself to the cylinder. After cleaning the piston and making a careful examination for cracks or flaws the piston should be carefully replaced. When putting the piston in in this manner the piston should be put together complete, including the expander ring, the gap on which should always be placed at the top of the cylinder. The piston should then be raised in a vertical position, keeping the piston rod as close to the cylinder as possible, until the piston head, which is horizontal, is opposite the centre of the cylinder, into which it should be then introduced. By crimping the leather in over the expander with the fingers, it can be gradually worked in, until past the centre of the piston head, when by placing the hand at the neck of the piston next the piston head it can be pushed in further. Until this time the piston rod has been pointing directly to the ground, or nearly so; now, grasping the piston rod, the piston should be pulled out slightly and raised up at the same time, thus bringing it to its proper position. Especial care should be taken not to force the piston in, as such forcing is liable to cut or otherwise injure the packing leather; to pull out at the same time that the piston rod is raised, else the leather will be doubled back the wrong way. See that the expander ring is in properly all the way round.

Quantity and Quality of Oil.—Oil that will not gum readily and yet have a good body should be used in the brake cylinder. A mixture of two-thirds engine oil and one-third mineral seal oil is well recommended. The ordinary lubricating or summer weight black oil will also give good results. Every three months the cylinder should be oiled through the oil plug provided for that purpose in the front head, and the levers uncoupled and the piston turned over in the cylinder, so as to leave the part of the piston that was formerly on the bottom on top. A suggestion that is well worthy of trial in connection with this is that the piston be turned around three or four times, so as to oil all parts thoroughly, and then leave it in the position described. In oiling at this time the same quality of oil should be used as before, and from one to two gills put in. To do this, a syringe should be used that will hold the required amount, and it should have a curved nozzle that will force the oil into the various parts of the cylinder. Care must be exercised in doing this, however, not to have the curved nozzle in such a position that the oil will be forced into the cavity in the brake cylinder head, the opening of which is very nearly in the centre of the head, for then the triple valve will get the benefit of the oil.

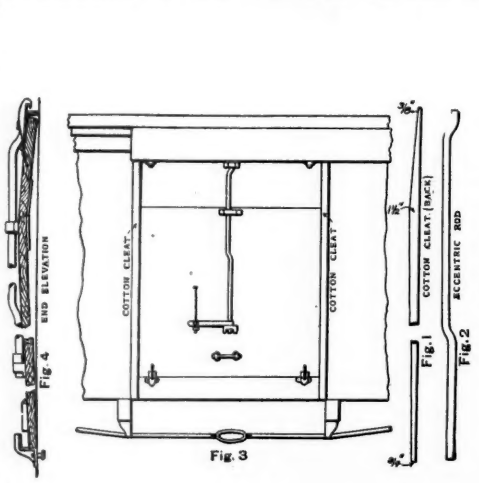
Care of Strainers and Drain Cup.—While not distinctly under this Committee, it was thought advisable to bring to the attention of the Association the important relation of triple-valve strainers to the brake apparatus. It is essential that as little dirt as possible be admitted to either the train pipe or triple valve, while at the same time a perfectly free and unobstructed air passage must be maintained. The hose coupling should be kept hung up in the dummy hook provided for the purpose at all times except when in use. This should be made the rule, and not the exception, as we sometimes see. This is as important on the tender as on the rest of the train. The dummy coupler is sometimes in such a position that it will be found impossible to reach it with an ordinary hose. It should be in such a position that it will not be necessary to kink the hose. The strainer in the triple valve should be examined every time the triple is cleaned. The car drain cup should be looked at about every six months. It is not very liable to cause trouble if the hose coupling is kept hung up and oil kept out of the hose.

*A Report presented at the Air Brakemen's Convention, Columbus, O., April 13, by Rob't Burgess, M. E. McKee, B. F. Houchin, J. A. Jesson, J. B. Swann, Committee.

Eubank's Spark and Storm-Proof Car Door.

The accompanying illustrations show the construction of a storm and spark proof car door now in extensive use on the Missouri Pacific and other roads and giving good satisfaction.

A noticeable feature of this door is, that it is made in two pieces which are joined by hinges on a horizontal line about 18 in. below the top of the door on the inner side. The door is normally flat either in a closed or open position, and can be moved from either position only after throwing the door outward at the joint far enough to allow it to clear the back cotton cleat shown in Fig. 1. This movement of the door is effected by the rod, Fig. 2. mounted vertically at the center of the door and extending from the extreme top to a point near the bottom as shown in Fig. 3. The upper part of the rod is bent eccentrically as shown and the lower end provided with a strap or handle pinned to the rod and serving to control its position. At the upper edge of the lower part of the



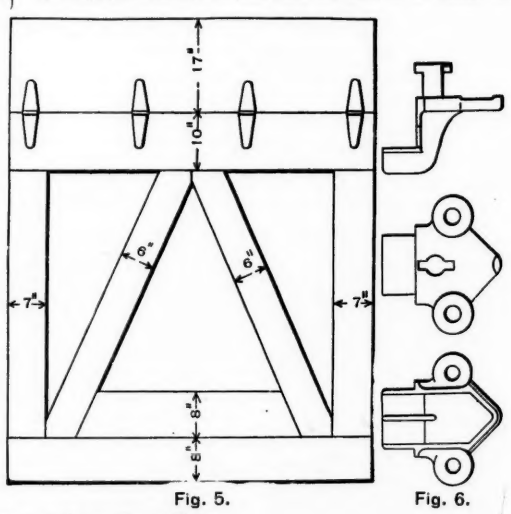


Fig. 5. Fig. 6.

Eubank's Patent Spark and Storm-Proof Door.

door is a casting through which the rod passes and which makes the position of the door conform to that of the rod, the adjustment being such that with the handle in its normal position the door will be tightly closed, while in its other extreme position the joint of the door will be thrown outwardly. Fig. 5 shows the inner side of a door. With the usual car door fastenings it is often possible to open a car without disturbing the seal, by removing the door guide at the lower back corner and pulling the door out far enough to gain an entrance, after which the guide can be replaced so that the car will show no signs of having been tampered with. The guide used with this door is of the form shown in Fig. 6, and has a spool one inch long on the back of the guide with a ⅝ inch lug in each side. The guide is placed on the car by boring a hole in the sill and cutting out a slot on each edge of the hole for the lugs. The spool is inserted and the guide turned to its proper position, the lugs cutting their way into the sill. After the door is closed and sealed, the guide cannot be turned from its normal position or removed, even though the bolts are taken out.

The guides, hangers and other fittings are of malleable iron. The door is sealed in the usual manner, a slat being provided in the strap or handle which fits over the seal pin keeper when the door is closed tightly. Our illustration, Fig. 3, shows the door applied to an ordinary box car, though it is especially adapted for use on ventilated fruit cars, and has been extensively used in that service.

Present Utility of Electric Motors on Railroads.*

This paper was prepared to show to what extent electric motors may be used in the place of steam locomotives at the present time and to outline the advantages of electric locomotives where the conditions permit their use. A short synopsis of certain portions of the paper appeared in our issue of April 27. The first part of the paper contains a description of the plain and multiple phase currents used with electric motors and explains the details of motor construction, then follows a description of the motors and controllers now in use. About the most important part of the paper is the discussion of efficiency, and that portion follows nearly in full.

EFFICIENCY OF PLAIN CURRENT MOTORS WITH POSITIVE CONNECTIONS.

Plain current motors are more efficient at high speed than at low speed, and without the controller the efficiency commences at zero and finally reaches about 85 per cent. at the highest speed. The curve of variation of efficiency without the controlller is shown by Fig. 1. The variation in the horse power at the central station without the use of the controllers is about as shown by Fig. 4.

With the controller the efficiency commences at zero and finally reaches about 85 per cent., but the variation between these limits is quite different from what it is without the controller, as is shown by comparison with Figs. 1 and 3. A comparison of the horse power required at the central station is furnished by Figs. 4 and 2.

Fig. 3 shows the efficiency of a plain current motor from a start to full speed for elevated railroad work. The maximum is about 85 per cent. and the minimum is zero. The average is about 60 per cent. but in this work it is safe only to assume 50 per cent. as the average efficiency. This is about the same efficiency as would be obtained in switching and suburban service.

The total horse power required at the drawbar for a 130-ton train on an elevated railroad is shown by Fig. 5, and the horse power required at the central station engine cylinders for an electric system to do this work is shown by Fig. 6, assuming the use of a controller. It is for this class of work that the electric motor is best adapted to give good commercial results.

Fig. 7 shows the efficiency from a start, to the time the brakes are applied for stopping, on a line that has about six minutes from the start to the putting on of brakes, are about eight minutes between stations on the time card; in this case there would be a run of about three miles at the maximum speed, when the maximum is 40 miles an hour. The minimum efficiency is zero as before and the maximum is 85 per cent., but the average is much higher than for short lines; that is, about 80 instead of 60 per cent., as in the case of elevated railroad work.

The efficiency of the line of conductors from the central station to the motors where the plant is properly put in ought to be 90 per cent. and the efficiency of the dynamos ought to be such as to give at the terminals of the dynamo a current that would represent 85 per cent. of the indicated power of the steam engine. The steam engines used ought to give a horse power for 15 pounds of steam per hour. Now, having this information we are in a position to show the relative efficiencies of steam locomotives and electric motors so far as the cost of fuel is concerned, leaving aside for the moment all others thcostat go to make up operating expenses, such as wages, repairs, interest on plant, etc.

If the same fuel is used on the steam locomotive as in the stationary boilers, and the fuel is assumed to be fair bituminous coal, then each pound of fuel will evaporate into steam about six pounds of water in the best steam locomotives, and 8½ pounds in a good stationary boiler.

The steam locomotive will generate a horse power for about 25 pounds of steam an hour when the locomotive is of the best type, hence, on this basis, a comparison of the economies of the two systems in the indicarted power in the steam cylinders of both systems is 1.8 pounds of coal per horse power per hour in the stationary engines and 4.2 pounds of coal per horse power for the steam locomotive.

The steam locomotive uses the power directly and there is no further loss that need be considered with this general comparison, but with the electric system there is a further loss of 15 per cent. in the dynamo and connections, 10 per cent. in the line, and 50 per cent. in the motors for switching, suburban and elevated railroad work, or 20 per cent. in the motors for lines having about eight minutes between stations. The final result is an efficiency of about 38 per cent. between cylinders of the stationary engine and the drawbars of the motors for switching, suburban and elevated railroad work, and 61 per cent. for the longer line assumed.

The result in the fuel used will then be 4.7 pounds of coal used an hour in the stationary engine to get one useful horse power on the drawbar on the electric motor for short lines, which is practically the same as that required for the steam locomotive. For the longer line assumed the fuel required is three pounds an hour per useful horse power. This is based upon an ordinary fuel; with a better class of fuel, such as anthracite burned on large grates, the locomotive will do better work in proportion and the difference in economy in weight of fuel will be in favor of the steam locomotive on short lines.

For elevated railroad work, where anthracite coal is used, the locomotive, if of the compound type, will not require more than 3½ pounds of coal per horse power an hour at the drawbar, and such fuel is better than the common bituminous coal that would be used in the stationary engines of the electric plant, hence so far as the use of fuel is concerned in actual work on elevated railroads, there would be no saving in weight of fuel by using electricity, but when allowance is made for the loss of fuel while the engines are standing fired up during the day and night, it is probable that the weight of fuel per ton per mile would be very nearly the same for the steam locomotive as for the electric motor when the same fuel is used, and somewhat less for the steam locomotive when anthracite fuel is used for the steam locomotive and cheap bituminous coal for the stationary boilers of the electric plant.

The conditions as to the use of fuel and the kind of fuel vary so much that each case must be treated by itself, but for all practical purposes of comparison at the present time it may be assumed that the same amount of fuel per ton mile would be used with the electric system as with the steam locomotives for short lines.

If the conditions are such that a cheaper class of fuel can be used in the central station than on the steam locomotive, there may be a considerable saving in the cost of fuel, while there is no saving in weight of fuel. On the elevated railroads in Chicago where the fuel costs about seven dollars a ton on the tenders, and the fuel for a central station could be purchased for 1.75 dollars, a saving in cost of fuel of 63 per cent. is possible. In this case allowance should be made for the difference in quality of fuel, which would reduce the possible saving to about 50 per cent.

In local suburban work and for switching, where the same fuel could be used on the locomotive as in the central station, there will be no saving in the cost of fuel, and if it was found that the locomotive required a somewhat better quality than the stationary plant, and if the stationary plant could use bituminous slack, say at $1.50 a ton, while the steam locomotive coal cost $2.20 a ton, the saving in cost of fuel would be 22 per cent. This again shows how the conditions which regulate the price of fuel control almost completely the saving in cost of fuel incident to the use of electric motors.

For long lines with considerable distances between stations, the efficiency of electric motors is very much greater, but the loss of energy in transmitting the current is also greater; the gain in efficiency of the motors will however more than offset the increased loss in conduction the current; hence, for such conditions the electric system is somewhat more economical in fuel than for elevated roads, switching or local suburban service, where the same fuel is used for both systems. On the other hand, the steam locomotive is also more economical during long continuous runs, and probably the average conditions for this class of work are such that the same weight of fuel would be used, in either case, per ton mile and it is only where the conditions demand a higher priced fuel for the steam locomotive than for the central station plant, that there would be any substantial saving in cost of fuel per ton mile by using the electric system at the present time.

The first cost of central station plants and conductors for long line work is so great per mile of track as to deter any steam railroad company from making an experiment of changing a large steam locomotive plant to an electric at present. The prices for this work are now so unsettled that it would be valueless to give any estimate of cost in this paper. Prices are dropping rapidly and it would not be surprising if one year hence the cost of installing an electric plant for long distance work would be only about one-half of what it was a year ago.

Only on short lines where the traffic is crowded is it now economical to substitute electric for steam locomotives. There will be no saving in cost of fuel where the same coal must be used in the stationary plant as is used for the steam locomotive and a substantial saving in fuel will only be obtained where, as in elevated work, the fuel is much more expensive for the steam locomotive than for the central station.

The repairs to the electric motors, the line conductors, and the central station plant added to the interest onf the first cost cannot be greater than the cost of repairs and interest on steam locomotives when there is heavy traffic, although the first cost of the electric motors is fully double. This will perhaps appear from the fact that less ork is necessary to main tain the electrical apparatu than the steam locomotive under equally favorable con-

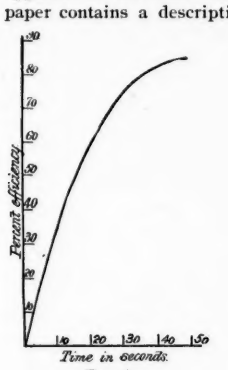
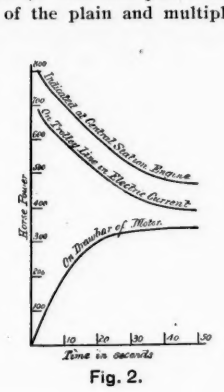


Fig. 1.


Horse Power
Initiated at Central Station Engine
On Trolley Line in Electric Current
On Drawbar of Motor
Time in seconds
Fig. 2.

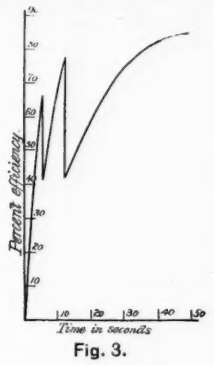
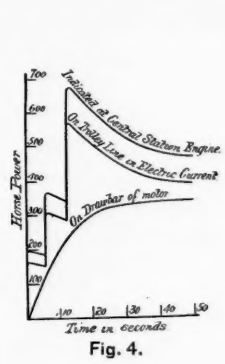


Fig. 3.


Horse Power
Initiated at Central Station Engine
On Trolley Line in Electric Current
On Drawbar of motor
Time in seconds
Fig. 4.

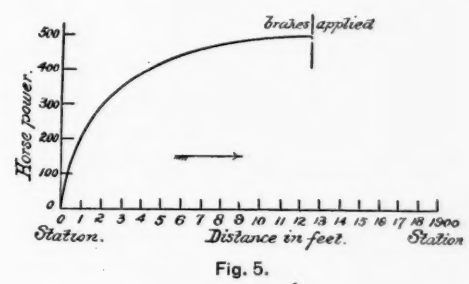


Fig. 5.

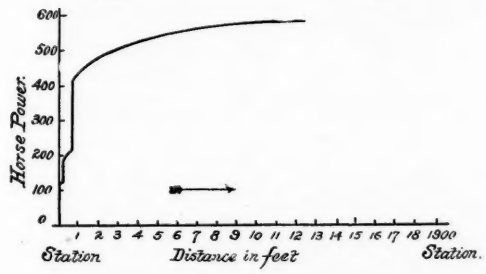


Fig. 6.

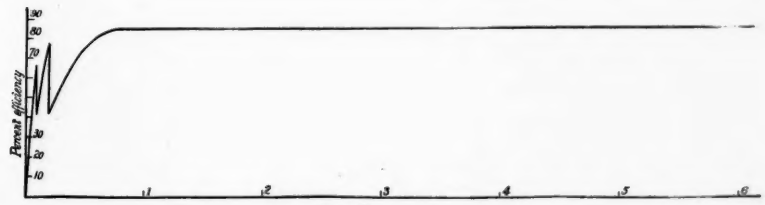


Fig. 7.

* Extracts from a paper by David L. Barnes, of the "Railroad Gazette" before the Western Railway Club, April meeting.

ditions for both. Especially is this true where the feed water is bad and the locomotive boilers collect much mud and sand. On the other hand, if inferior electrical apparatus is used and some considerable experiment is required to get a safe insulation of the line conductors, and to put the mechanism of the controllers and motors into good running shape, the cost of repairs and maintenance of electric motors for the first two yeats will be very much greater than for the steam locomotives. This has been the experience of street railroad lines that purchased electrical apparatus during the period of rapid development. One of the most prominent and largest street railroad systems of this country has had to renew more than half of the motors under the cars and make radical changes in the central plant, mainly for the reanson that a few years ago, at the time the apparatus was put in, the art was in a stage of rapid development and when the more perfect and better apparatus was brought out, the best interests of the company demanded that the devices first put in, although comparatively new, should be cast out.

For these and similar reasons estimates made as to the cost of maintenance and deterioration of electrical apparitus should include such changes as will probably be required in the apparatus due to the advance in the art. While it may be true, as sometimes claimed, that electrical apparatus of the best kind will last in good working order for a period of 50 years, yet it must be remembered that long before such a period is passed the apparatus will be out-of-date and will have to be replaced by more practical and economical mechanism.

It will appear from this perhaps that no railroad company should undertake the substitution of electric motors for steam locomotives without the most searching inqiury into all phases of the question. Each piece of apparatus should be carefully examined, not only as t its durability and efficiency, but also as to its stage of development. The difficulty with similar apparatus on street railroads should be considered, and in making the final comparison of relative costs of maintenance and operation a factor of 10 per cent. per annum should be added over and above interest cost and maintenance so as to include the cost of such changes as will probably be required on account of the progress in the art.

Railroads running through a thickly settled district and having to contend with complaints about noise and smoke may find it worth an additional expenditure to remove the cause thereof, and where a railroad company is compelled to use a high priced fuel to get rid of smoke, it will be found advantageous and probably cheaper to use electric motors at the present time.

It has been claimed that only one man is required on an electric motor at the head of a train, and therefore that there is a saving of one man per train when electricity is used, but this is only true when there is not a separate motor at the head of a train and where the cars are run as on the Intramural road and the conductor is on the rear platform of the front motor car ready to give assistance in case anything happens to the motorman. Where the motors are separated from the train, it is not considered safe to use only a single man at the front end, for reasons that are too plain to require discussion here. It is probable that many railroad managers would decide always to use two men at the head of a train whether there was a motor car or a separate locomotive.

The trolley wire system of conductors has been proved to rbe practical, and it is safe to introduce it at the present time. The third or conducting rail system can be so insulated as to be made practicable but the experience with it is much less. The service on the Intramural road was too slow and light to ssettle this point for heavy traffic on lines where passengers must in emergencies alight on the tracks and employes musts travel to and fro in making repairs. Perhaps the trolley need not be overhead, it may be at the side of the car, but the fact remains that the overhead trolley is the only system of conductors that has been sufficiently well developed to enable one to pronounce upon its practibility with certainty.

In the future the most rapid introduction will be for elevated railroads and for suburban lines and switching where the smoke nuisance must be abolished. For exceedingly high speeds, say 100 to 150 miles an hour the electric locomotive has the advantages that the steam locomotive can never have, but that there will be any real demand for any such speeds in the near future is doubtful. One derailment at 100 miles an hour will dampen considerably the ardor of those who now clamor for the highest possible speeds. Even with the strongest wooden cars now built the loss of life in a collision at 100 miles an hour would be appalling. Metal cars and greater certainty of a safe clear track must be had before trains will be run at such high speeds as to require electric motors.

In the matter of men and tools for repairs railroad companies will need but few chanages to care for electric locomotives. The maintenance of the conductors and central stations will probably fall to the road department and electric locomotives differ so little in running gear from the steam locomotive and are so simple in construction as to require no special knowledge to care for them. With the assistance of a good mechanlcal engineer, posted in electrical work, our railroad Master Mechanics can care for the electric locomotive quite as easily as the steam locomotive and the experience gained with the steam locomotive is absolutely essential for the economical maintenance of the electric locomotive, which locomotive must have practically the same cabs, air brakes, wheels, springs, draft gear, head gear, running boards, pilots, driving boxes, etc., as well as an equal corps of runners and assistants.

A Mine and Tunnel Velocipede.

Herewith are two engravings of a mine and tunnel car, built by the Sheffield Car Company of Three Rivers, Michigan. It is especially designed for use in mines that have long tunnels drifted into the side of the mountain for drainage and gravity tracks, and has found a large sale in Colorado and California.

The machine is a novelty in light cars, and weighs only 85 lbs. It has been built for 18 in. and 24 in gage. The

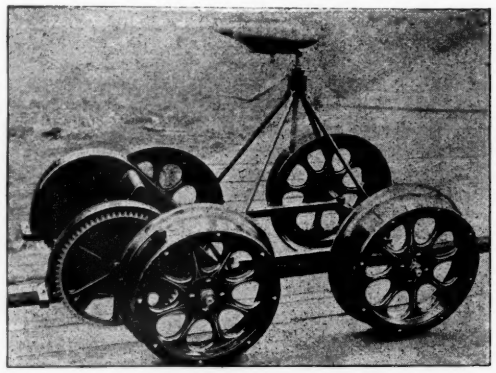


Fig. 1.

wheel base of an 18 in. gauge car is 21 in., the diameter of wheels 14 in., and the minimum height of saddle 30 in. The frame is of iron and steel, and the wheels have steel hubs, rolled steel flanges and wooden spokes. It is driven by machine-cut gear and the crankshaft is hand forged, carefully turned and carried in brass journal boxes.

Fig. 2.

The seat is of the Garford bicycle pattern, adjustible and of extra strength. Ten to 12 miles an hour can easily be made on this car, and coming out of the mine on the down grade it may be operated at 15 to 20 miles, as fast as it is safe to ride. Fig. 1 shows the side and elevation of the car, while Fig. 2 shows a front view of the machine in operation. Over 100 of these cars have been sold in Colorado alone, which indicates their popularity with owners, superindendents and foremen of mines.

The Great Northern Strike.

Until Friday of last week the officers of the American Railway Union had not ordered their men out on the Eastern Minnesota, nor had their members in St. Paul and Minneapolis been called out. The final order calling out every member on all the lines controlled by the Great Northern was given when the officers of the Union were satisfied that President Hill was determined not to accede to the demands of the strikers.

On April 23d Governor Nelson, of Minnesota, addressed letters to Mr. Hill and Mr. Debs, suggesting that the matter be submitted to arbitration. President Hill immediately agreed to the proposition as stated in the *Railroad Gazette* last week; and so did Mr. Debs, personally, but his committee insisted upon the original proposition—the restoration of all wages schedules which were in effect in July, 1893.

The committee then sought a conference with the officials of the company, and for the first time in the history of labor troubles the representatives of the press were admitted and a stenographic report of the proceedings was published in the local papers. The company refused to restore the schedules, and the committee of the union announced that it would listen to nothing else. President Hill asked the committee to reconsider and submit a proposition for arbitration, but it did not recede from its ultimatum. The proposition to arbitrate was generally regarded an eminently fair one; and the American Railway Union had been heralded as a non-striking organization.

Through the restraining order issued by Judge Sanborn of the United States Circuit Court, the company was able to maintain an intermittent mail train service in Minnesota and North Dakota, but no freight trains have been moved. On the 26th an inter-state freight train was made up at St. Paul and run to St. Cloud, 75 miles, but there the brakemen were "induced" to desert their posts and the train had to stop.

On the 28th the General Grievance Committee of the Old Brotherhoods were notified that their pay in their respective departments had been restored from April 1, and the men were called upon to return to work on the 30th.

Numerous arrests were made by the United States marshals, both in Minnesota and North Dakota, and the prisoners held to the United States grand jury on the charges of conspiracy and interfering with the United States mails. In the latter State Marshal Cronan, having met with considerable resistance, the United States troops in the department of Dakota were called out. On the 29th a battalion, comprising four companies of the Third United States Infantry, was dispatched from Fort Snelling, Minn., to Grand Forks, N. D.

In Minnesota the 100 or more deputy marshals were able to make arrests and to preserve order at the several points where trouble was anticipated. No property was destroyed, although switches were spiked and one or two instances of loosened rails were reported. The interference consisted in cutting out of the trains everything but the mail car. After the opinion of acting Attorney-General Maxfield, in which he defined a mail train to be one as it is usually made up, and not simply an engine and mail car, had been published, there was practically no interference with the running of mail trains.

There is great inconvenience, loss and suffering at many points along the line. Hundreds of the towns are reached by no other roads, and the distance to the nearest railroad is frequently a hundred or more miles through a rough and sparsely settled country. At many points on the road mills and other industries have been forced to close. Provisions are running short at several places.

The Attorney General of Montana last week began proceedings in the Supreme Court of that State to compel the road to operate its lines. The petition states that the road has wholly ceased to operate any of its lines within the State and refuses to accept freight or passengers, althought it is fully able to operate its road; that there are at all points along its line within the State a sufficient number of competent men who hae been engaged to do so at reasonable wages; and at less wages than are paid to siimlar employees upon any other line in Montana; that the counties in the northern part of the State are alomst entirely dependens upon the Great Northern for transportation facilities, and that the neglect of the road to run trains has already resulted in great loss to inhabitants.

Alterations in the Rules of Interchange.

Below is given an abstract of the discussion at the April meeting of the Western Railway Club of the recommendations of the committee as to alterations in the Rules of Interchange of which an outline was given in our issue of April 13.

Rule 3.—Section P. The club was of the opinion that the last clause should be omitted from the section, cars of 20,000 pounds capacity and journals of 2 3-4 in. diameter being practically obsolete so far as interchange is concerned.

Rule 3.—Section R. The recommendation of the committee that this section be changed to read "Out of guage, or wheels that measure less than 4 ft. 5 1-8 in. or more that 4 ft. 5 5-8 in. between flanges, or less than 5 ft. 4 in. over treads," was adopted after considerable discussion as to the effect of wheels out of guage, sharp flanges and thick flanges upon frogs and switches.

Rule 3.—Section S. The recommendation of the committee that paragraphs 1 to 16 inclusive be omitted, was not adopted by the club, it being urged that inspectors should have explicit instructions as to what constitutes a defect, and that such instructions should be standard on all roads.

Rule 3.—Section U. The recomendation of the committee that paragraphs 1, A, B, C, D, E, F, G, H, 2, 3, 4, 5, 6, 7 and 10 be omitted, was also rejected on the ground that such an omission would leave too much to the discretion of the inspector.

Rule 3—Sections Y2 to Y5 inclusive. Mr. Waitt proposed to amend the recommendation of the committee by changing Section Y2 to read: "Cars with center plates having less than two effective bolts, unless fitted with long center pin" and omitting Sections Y3, Y4 and Y5. Mr. Waitt thought that there was a considerable difference of opinion as to what is safe in connection with centre plate bolts broken or missing, that some thought it immaterial whether centre plate bolts were whole or not, provided a good long center pin was used, while others considered a certain number of bolts necessary.

Rule 8.—The three additional sections suggested by the committee, viz: Section F. Oil box covers lost when not caused by wreck or breakage due to rough usage. Section G. M. C. B. knuckles worn out. Section H. Air hose burst or worn out, were adopted after a short discussion.

Rule 12.—The recommendation of the committee that a clause be added to this rule, providing that "In case the owner of a car removes an axle on account of defective wheels, the road responsible for damaging the wheels shall not be charged for any difference in value between the axle used and that removed," was also adopted.

The recommendation that the following rule be inserted after Rule 20 was discussed at considerable length

and finally rejected. "A railroad company shall not be held responsible for wrong repairs not made by it on cars passing over its lines to the owners, if the wrong repairs are of such a nature as to render it impossible for inspectors to discover or know that such repairs did not conform to the requirements of Rule 15." It was held by Mr. Waitt, Mr. Peck and others that such a rule was nedeed to protect parties delivering cars from charges of wrong repairs, the repairs having been made by some company through whose hands the cars had previously passed, that in many cases it was impossible for inspectors to determine whether or not cars were fitted according to the standard of the road to which they belong, and that the road owning the cars could determine who was actually responsible for the wrong repairs. On the other hand it was urged that such a rule would tend to weaken the present rules intended to cover the question of wrong repairs, and that the item of labor required to make the necessary changes, and the difference between the wrong and right material was too small to warrant the making of such a rule.

Rule 23.—The club adopted the recommendation of the committee that a table be added to this rule for figuring depreciation. The motion was made by Mr. Schuyer that the club recommend that old defects should not be cared for except by owners of the cars. The motion was seconded and adoptd after considerable discussion by the members of the club.

Rule 26—. In place of the recommendation of the committee that an arbitrary price be established for M. C. B. couplers and knuckles in interchange, less scrap; and that such price be $4.00 for couplers and $1.00 for knuckles, the club accepted the amendment offered by Mr. Waitt providing that the club recommend a revision of the price list on page 28, and that a price for wheels, axles, couplers, knuckles and locking parts, and hose should be added.

Mr. Rhodes proposed the following rule: "When wrong material is used and afterward charged back to the party applying same (Rule 19), or when material is worn out and charged to owner under Rule 8, the party against whom the bills are made may require the worn out parts to be returned as evidence of the correctness of the charge, providing such request is made within two weeks from receipt of bill. The material will be shipped without freight charges over the line making the charge (Rule 25). Failure to produce the material will warrant a cancellation of the bill." The club, after a short discussion adopted the proposed rule.

Railroad Matters in Chicago.

Freight Traffic and Outlook.—There is no material alteration from last week; nor, perhaps, is the movement of freight from the country to the leading markets disappointing to railroad officers who keep close watch of affairs, the falling off on some descriptions of traffic being balanced by an excess on others. The aggregate deliveries here by eleven Western roads the past week were 94,830 barrels of flour, 2,758,000 bushels of grain, 57,588 head of cattle, 108,188 head of hogs, and 51,381 sheep, against 90,281 barrels of flour, 2,294,000 bushels of grain, 57,500 cattle, 142,000 hogs and 57,300 sheep, the week ending April 21 this year, and 83,794 barrels of flour, 2,726,000 bushels of grain, 62,615 cattle, 129,719 hogs, and 63,774 sheep, the one ending April 29, 1893. The past week's movement of mixed produce shows equally well with the same periods in 1891 and 1892, and there are reasons for assuming that despite the present moderate business, the leading lines are deriving as great revenue from their freight traffic as at this time last year. It is also well to state that during the closing half of April a year ago, the extreme scarcity of money in the country induced country shippers, a majority of whom had sold large blocks of grain deliverable May 1, to send it forward. Now there is less incentive for forcing grain forward. The failure of the past week's flour traffic to reach a larger volume was charged by Chicago roads to the cut rates made by rail and Lake lines from Minneapolis via Duluth and Buffalo to New York, the Chicago rates to New York being 20 cents per 100 Ibs., whereas those from Minneapolis via Duluth are reported at 19 cents. The shipments were less than during the week immediately preceding, the decrease being largely due to the suspension of work at the coal mines in this and other Western States, coupled with strikes in manufacturing establishments. It is scarcely necessary to add that the prospects are of a further decline in our freight traffic, and managers who were recently hoping for continued average earnings from that class of business, feel blue because of the unfavorable change.

In view of the adverse change in the prospects for traffic railroad officers are more pronounced in their efforts to economize in the management of their roads than at any time since the curtailment of expenses was first inaugurated. Said an official of the Northwestern: "Our train and office forces will be reduced, and no improvements undertaken that are not necessary. We will try to keep expenses down to a lower summer average than for years. We have ordered some rails, but not half as many as we usually bought up to this time in former years, and shall not buy any more unless we find it positively necessary, which I doubt. The same course will be pursued in regard to rolling stock. Nothing will be bought until the necessity for it becomes apparent, and for the first time in years we have no new branches on hand." General Manager St. John of the Rock Island said: "I have just returned from an extended trip over our system, and while I cannot say that the business conditions are all that could be desired, they might be worse, and our current earnings on the whole are up to anticipations. The prospects for a wheat crop along the whole line to the end of the Texas division are fair, and the early damage from cold weather promises to be compensated by an increased acreage in every section. The outlook for other crops is good and the largest acreage in the history of the West will be seeded." General Manager W. F. Merrill of the Chicago, Burlington & Quincy, who has also recently returned from a trip over his system, said: "Business is still dull although there is a fair amount of property to move, and the crop outlook in the West is very fair. We have bought 14,000 tons of rails so far this year, and are only buying as our wants demand." The managers of a number of leading lines reported small purchases of rails for relaying track, and said they should only order materials as wanted. The officer in charge of the sales department of the Illinois Steel Company, said: "We have recently recorded a good many sales of rails and other track equipment to Chicago and other Western roads, and while such business will keep our mills at work for some time, the orders are almost invariably for small lots. I never saw railroad managers so cautious in buying."

The following shows the deliveries of flour (bbls.) at Chicago by the leading Western railroads for the week ending April 28, and comparison with the two preceding years:

	1894.	1893.	1892.
	Flour.	Flour.	Flour.
N. West.....	13,625	18,995	15,934
Ill. Cent.....	.....	1,925	.....
C. R. I. & P.....	22,413	2,250	4,125
C. B. & Q.....	23,379	18,900	26,818
C. & Alton.....	4,500	751	7.550
C. & E. Ill.....	700	.....	.....
C. M. & St. P...	17,550	22,650	19,325
Wabash	929	450	1,615
C. & Grt. W.....	11,734	17,423	6,521
A. T. & St. F...	.....	450	121
L. N. A. & C....	.....	.....	.... .
Total.....	94,830	83,794	82,018

The deliveries of grain at Chicago by the leading Western railroads for the week ending April 28, and the corresponding time the two preceding years, compare as follows:

	1894.	1893.	1892.
	Grain.	Grain.	Grain.
N. West.....	559,000	420,000	346,000
Ill. Cent.....	253,000	442,000	188,000
C, R. I. & P	352,000	20,000	322,000
C. B. & Q.....	512,000	996,000	711,000
C. & Alton.....	146,000	54,000	182,000
C & E. Ill.....	32,000	44,000	50,000
C. M. & St. P...	401,000	320,000	370,000
Wabash..	165,000	109,000	138,000
C. & Grt. W....	86,000	136,000	94,000
A. T. & S. Fe...	236,000	185,000	165,000
L. N. A. & C....	16,000	.....	.....
Total.....	2,758,000	2,726,000	2,566,000

Track Elevation.—Aside from an abundance of talk by a lot of aldermen nothing has recently been done in the way of track elevation. Despite the annulment of the proposition to the Lake Shore, the Mayor continues his negotiations for carrying out the proposition. In fact the only question of consequence is that of damage to abutting property on four blocks, which the Mayor asks the railroads to pay, agreeing that the city will assume all responsibilities of that character south of Twentieth street. The railroad officers, knowing the difficulty of obtaining a just verdict, offered to pay the city $100,000 and let it settle the damages. The Mayor, although so far declining to accept the offer from the roads, is said to be disposed to do so as a last resort, believing, it is said, that the city is impotent to force track elevation, and it is thought that a final agreement will be reached at an early day.

Chicago, April 30.

Foreign Railroad Notes.

In Switzerland, when a train is to start from a station, notice is given first by an electric bell, which rings also at the adjacent station, and is meant to notify the train and station men; then the conductor gives a blast on a mouth whistle, whereupon three strokes are given on the station bell, and you are off without further notice. It has occurred to some one that there is a certain too-muchness in this process, and it has now been determined that the last one, the three strokes on the station bell, shall be omitted henceforth.

The tickets of the Austrian zone tariff (not to be confounded with the Hungarian) hereafter may not be sold in advance for the first five zones; and all zone tariff tickets in future will be good only on one route and in one direction, having heretofore been good for so many zones anywhere and in either direction. On certain sections of railroad out of Vienna, however, tickets will continue to be sold in advance and good either way.

The Austrian railroads had a rule by which any excess of load beyond that marked on a car as its full capacity had to be paid for at ten times the regular rates. The shippers have complained bitterly of the rule, and in a recent conference of shippers and railroads the latter have agreed to make the charge for excess weight three times instead of ten times the regular rate. There have been in this country instances where the excess at the new rate even would have made a pretty fortune for somebody at not very large stations in a single year. Of course if the excess rate had been collected, there would have been no excess.

The Emperor Ferdinand Northern Railroad of Austria, by its charter, is required to reduce its rates when its profits yield its shareholders more than 100 florins per share. In accordance with this provision the government asked the company to propose reductions of its freight rates on the basis of its profits of the year 1892. The company has submitted a new tariff reducing carload rates on cement, iron, spirits, salt, etc., which are said to remove the chief differences between its rates and the state-railroad rates. Rates have been reduced in this way three times before, the last time only two years ago. Coal rates have been reduced several times.

The Russian railroads are required to employ as firemen only persons who have served a year as machinists in the shops. This rule has been suspended until next June, as also have been other regulations prescribing hydrostatic tests of boilers, and prohibiting in winter the running of locomotives whose tires have been worn down to a thickness which is permitted in summer. All these relaxations are supposed to be due to a pressure of traffic.

A branch of the Trans-Caucasus Railroad (Black Sea to Caspian) was built recently to some rich manganese deposits; but since it has been completed about half of this product continues to be carried out. The new railroad is said to be able to carry only 72,000 tons a year, say 200 tons per day.

They are boasting in Russia of a railroad track they have laid on the ice across the Volga at Saratov. For many years the Milwaukee & St. Paul maintained a bridge on the ice across the Mississippi at Prairie du Chien (or was it La Crosse?), over which all its St. Paul traffic passed in the days when it had all the St. Paul traffic. In Russia the crossing is particularly convenient now, because they are building a railroad on the other side of the river toward the Ural Mountains.

A railroad which the Germans have built in Asia Minor, extending from Ismid, a harbor about 60 miles east of Constantinople, east by south 309 miles to Angora, has as little wood in it, perhaps, as any in the world. Not only the rails and bridges, but the ties and telegraph poles, are of iron, nine-tenths of it furnished by German works; and chiefly by Krupp. There are no less than 1,200 bridges on the line, one measuring 590 ft., one 458, one 445, and three 327 ft. There are 16 tunnels, the longest measuring 1,430 ft. This is the only railroad which penetrates into the interior of Asiatic Turkey, the Smyrna lines being all near the coast. An extension of a little more than 400 miles east from Angora would bring the road to the Euphrates near the Armenian border.

Under certain conditions, the Russian railroads are authorized to use the military forces for clearing snow from their tracks. When they do, they must pay $2.50 a day to a staff officer, $1.50 to other officers, 75 cents to a non-commissioned officer, 50 cents to a private, and provide them with a pound of meat a day and tea or whisky.

The Railroad Statesman in France.

The French railroads are not without their legislative troubles. At a recent session of the Parliament, Deputy Berry, who appears to be a new member, thought that it would be a good notion to make some capital out of the railroads. He began by saying that out of the total of 262 millions of passengers carried in 1892, 531 had been wounded and 67 killed. He specified passengers, saying that the killed and wounded among employees were much more numerous. He added that in England out of 868 millions of passengers carried there had been 600 wounded and but 22 killed, and says, "I leave aside the statistics of other countries, where the number of casualties is much below these figures." He considered it important therefore that some measure should be taken, and taken at once, to correct this condition. Fortunately there were those in the Chamber who could correct his figures on the spot, for it appears that in 1892 there were no passengers killed in French train accidents and but 198 wounded. Mr. Berry had fallen into the error, so common with statisticians coming fresh to this matter, of considering not only the victims of train accidents, but suicides and those who were killed and injured because of their own imprudence. This error is made over and over again in the United States by people who class as railroad accidents willful suicides, the killing of tramps and of trespassers of all sorts.

Mr. Berry having arrived at figures that satisfied him as to the relative importance of casualties on the French railroads, proceeded to analyze the causes of them. These, he says, are due to boiler explosions because the boilers are worn out, and to the breaking of the chains between carriages because of the over-economy of the companies. These two causes he considers the most important, but they are followed closely by overwork of employees as another cause of accidents. For instance, certain locomotive drivers, Mr. Berry says, make 30 hours of service in a day. It will be seen that he has discovered even a greater evil of overwork than has been found by the English and American reformers. The same evil, although perhaps to a less degree, he discovered in the hours of work of switch and signal men. As a matter of fact, however, the French signalman never works more than 12 hours in a day. Where the service is continued through 24 hours it is divided into three 8-hour shifts; elsewhere the work is so intermittent that 12 hours is not extreme. The solution which Mr. Berry proposes is that every employee directly responsible for safety, signalman, engine driver or the like, shall be duplicated, there being two men on duty simultaneously in each of these positions.

RAILROAD GAZETTE

ESTABLISHED IN APRIL, 1856.
Published Every Friday.
At 32 Park Place, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

Certain members of the American Railway Union held a meeting last Monday night in Des Moines, Ia., and telegraphed to President Debs, of the Union, asking for a general tie-up of the Rock Island Railroad if that company refuses to assist the onward march of a certain wing of that band of tramps known as "Coxey's Army." This wing, we believe, is specifically known as "General Kelly's Army." This is indeed reducing to an absurdity the notion of managing the affairs of a railroad through bodies of organized employees. The Coxey movement is simply grotesque; or it would be grotesque if it were not for the amazing and humiliating example it affords of the cowardice of state and municipal authorities. Yet we see a body of workingmen, of alleged intelligence, trying to stop all trains on a great railroad and to subject the country between Chicago and Denver—say 1,000 miles east and west, and 750 miles north and south—to great inconvenience and considerable pecuniary loss, and to compel the owners of that railroad property to lose an important part of their income and a lot of honest workmen to lose their wages, in order that a lot of tramps, loafers and ex-convicts may ride without paying fares. It might not be a bad thing if this strike could be brought on. It would make the issue clear. It would show, as nothing else has shown, what an irresponsible body the American Railway Union is. We cannot think that Debs is such a fool as to permit such a strike.

The strike on the Great Northern was settled on May 1. The difference between the officers of the road and the striking employees, represented by the leaders of the American Railway Union, were referred for decision to a committee of ten or fifteen prominent business men of St. Paul and Minneapolis. It is stated that the company granted three-fourths of the demands of the employees, which means, probably, that it agreed to restore wages to that extent to the rates in effect before the recent reduction. But no particulars are given and it does not appear whether the rates have been restored to anything like the figures in force before the very heavy reductions made in August last. On April 28 the chiefs of the Knights of Labor ordered their members on the Great Northern to cease working, but it does not appear that the order had any marked effect. It is not possible, with the facts at hand, to form an intelligent conclusion as to the merits of the wages question which started this strike. The road is undoubtedly in severe straits financially, for in addition to suffering from the hard times like all other roads, it has a long new line which is a burden at best. But the arbitrators were business men of high character and it is to be presumed that they have made a fair decision. In view of the very radical reductions in pay made by President Hill last August, of the reports that the men were treated rather harshly then, and that Messrs. Shields, Mohler and Case resigned because they could not agree to the severe retrenchment ordered by the President, it is apparent that not all the arguments were in favor of the road. It is understood that the older brotherhoods will try to discipline, or perhaps expel, the members who struck in sympathy with Debs' union, which is looked upon, of course, as an upstart without decent standing. The outcome of this will be watched with interest.

The Toledo & Ohio Central, according to items in local newspapers, has made important changes in discipline of employees. The old system of reprimand, suspension and dismissal has been abolished, and in its place a bulletin has been instituted. "Each offense is daily cited by the superintendent, who writes a short brief of the case, together with the findings, and quotes the rule which has been infringed. A copy of this is placed on the bulletin board, where all employees see it. . . . While the men object to having their misdemeanors made public, they see that the system of bulletins acts as a school of instruction, and the ruling of the superintendent can be used in future cases. There are two bulletins, one in the offices for trainmen and the other in the engine house." Probably this means the plan long used on the Fall Brook Railroad, and heretofore mentioned in the *Railroad Gazette* But the reporter makes the statement a little too sweeping; to abolish dismissal it will be necessary to put a stop to all the most serious offenses, instead of merely mitigating them or lessening their number, and no one has yet found an infallible recipe for doing that. And if the Superintendent of the Toledo & Ohio Central has learned how to get along without ever reprimanding a man he deserves a patent on the invention without delay. The actual reform, if the planis anythinS like that which Mr. Brown has so successfully employed on the Fall Brook, is in abolishing suspensions, which means more reprimands—or morecases in which a reprimand alone is depended upon to properly punish the offender and prevent a repetition of the offense. It also makes fewer dismissals, if properly followed up, and if the employees are the right kind of men to start with; for the reasonable reprimand, unaccompanied by a deprivation of pay, is the most effectual cure for minor offenses, while the bulletin is a most effective punishment for more serious mistakes. But a velvet glove is out of place in railroad management unless the hand of iron is within it, and it may be that for a time the number of dismissals ought to increase. Suspensions have come to be looked upon somewhat in the light of a dismissal, especially where they are for long terms, and the abandonment of suspensions may necessitate more severity in some cases. This is a good result, for the infliction of a long suspension is often merely a compromise by an officer who knows that the employee ought to be discharged, but who shrinks from the trouble that will ensue if he takes the severe measures that the service really requires. The Toledo & Ohio Central, like the Fall Brook, is a small road—that is, it does not employ many thousand men—and so the new plan ought to work well. An essential factor in all good discipline is to have the real master in close touch, or at least in quick and intelligent communication, with the employees, and on these smaller roads this can be accomplished.

Whenever railroad business becomes very bad and earnings fall off seriously, and to meet the losses all expenses are reduced as much as possible, many people, including some who ought to know better, seem to think that the railroad managers have discovered new methods of working, or suspended huge wastes in expenditures. Now in nearly all cases, the managers who are reducing expenses so largely are the same men who were spending 10, 15, 20, or 30 per cent. more for working the same roads a year ago. If these savings could have been made then, then the managers are convicting themselves now of astounding negligence or dishonesty heretofore. The Chicago, Burlington & Quincy spent 39 per cent. ($629,121) more for working expenses in March last year than this. The Pennsylvania, 33 per cent. ($1,068,183) more. Shall we therefore conclude that these companies might have earned $7,500,000 and $12,000,000 more for their stockholders if they had been managed as economically last year as this? It seems childish to speak seriously of such a thing. Yet no less a newspaper than the New York "Evening Post" says in its financial columns last Tuesday, commenting on recent great reductions in expenses on the Chicago, Burlington & Quincy, and the Chicago, Milwaukee & St. Paul, "this merely seems to confirm the old belief that these huge Granger systems have been marked for years by wasteful operation. They have learned a useful lesson." If this is an "old belief," we must say that we never heard it expressed by anyone familiar with the actual management of these "huge Granger systems," and we venture, in the face of it, to make the assertion that for many years there has not been on the face of the globe any railroad systems more economically worked than several of these "great Granger systems." Considering the wages and prices of materials which these companies have to pay, and the thinness of the traffic on a very large proportion of their lines, the cheapness with which they are worked is one of the great marvels of modern industry, and commands the wonder and admiration of all competent European visitors, many of whom, especially from Germany, have studied our railroads of late years. The great reductions of expenses now made are largely the result of necessity, and cannot possibly be continued indefinitely, as some of the managers have been frank enough to report publicly; aside from which, on systems consisting largely of new lines, an almost absolute suspension of improvements, such as in prosperous times would be charged to expenses, makes a great difference, to be added to the natural reduction in expenses due to less business and lower prices, and in some cases lower wages. We are confident, however, that the managers of the great Granger lines are no more skillful, no more devoted to the interests in their charge, and no more honest this year than they were last year, and that they do not need to be to entitle them to a very high place in the ranks of their occupation.

Long or Short Smoke Boxes.

Three correspondents in this issue, take up the subject of long and short smoke boxes, about which there is little agreement among locomotive men. So few facts have been established that the committees appointed by the Master Mechanics' Association have on two occasions in the past practically acknowledged their inability to cope with the subject without more facilities for experiment than are provided in regular locomotive service. In England, in Germany and France, the investigations made, both mathematically and with locomotives in service, have not brought about uniform practice. In this country several tests with models, and in one case with an actual locomotive, mounted on carrying wheels, and a very large series of costly experiments on different railroads with locomotives in regular service have only resulted in increasing the number of different types of smoke box apparatus in use. A good illustration is found in the fact that smoke boxes are considered by some to be too long when they are more than 36 inches from the tube sheet, and by others too short when they are less than 50 inches from the tube sheet. Exhaust nozzles on some roads are only considered well placed when they are so located that the steam jet will fill the stack near the top, while others assert that the jet must fill the stack near the bottom. Some roads are using 18-in. stacks on the same size of engine, where other roads use 12 in. It is curious to see a 12-in. stack on a 16-in. cylinder engine, and on the same road the same stack on 22-in. consolidations, yet this is the case. Two master mechanics have recently found that the exhaust nozzle can be made so large and placed so low as to pull the fire too hard, and in several instances in order to reduce the blast they have had to decrease the size of the nozzle. To some it will seem ludicrous that anyone should claim that an exhaust nozzle could pull the fires too hard because it is too large. The general supposition is that a small nozzle makes more draught than a large one under the same circumstances.

All this goes to show how little that is definite and useful is known about the subject; a state of affairs not to be proud of, but we have the poor comfort of knowing that the railroad mechanical engineers of Europe are in the same boat, with the sails flapping in about the same way, and all will have to do some pretty hard rowing to get ashore. Nothing but a series of accurate tests by railroad men who understand the practical condition of locomotive operation with apparatus that is stationary and under full control, will ever settle this important matter. The committee appointed by the Master Mechanics' Association last year is just reaching a point where it can get some accurate data, but this committee will have to be continued at least another year and be authorized to use all the facilities and resources of the Association before final conclusions can be reached. Through the energetic efforts of the chairman, Mr. Robert Quayle, of the Chicago & Northwestern Railway, the Association will this year have the benefit of a series of tests made on a stationary locomotive, mounted upon carrying wheels in a very ingenious way. Mr. Quayle has succeeded in doing at a very low cost what many have tried to do and failed; viz., mounting a locomotive so that it can be tested accurately with the ordinary railroad shop facilities, and the enterprise of the Chicago & Northwestern in authorizing this work is very commendable.

The locomotive is of the eight-wheel type, built by the Rhode Island Locomotive Works, and is in good condition, the valve motion having been rearranged so that the indicator cards taken from the engine are the best we have seen from a locomotive with the Stephenson valve gear; in fact they are as good as are produced from stationary engines having sliding valves. The carrying wheels and framing are simply an engine truck of the four-wheel type turned bottom side up and mounted on a plain wooden foundation. The power is absorbed by brake shoes, cooled by streams of water in a very simple way. The design and construction of this simple and efficient apparatus will be published in the proceedings of the Master Mechanics' Association this year and the results will be of interest and value.

Regarding the relative volumes of smoke boxes, much can be said that appears reasonable and much is being done that is not only unreasonable, but as one of our correspondents would say, "is excessively stupid." Zera Colburn said, in 1854: "The direction of the passage from the tubes to the smoke stack must be eased, and its contents reduced to the smallest possible extent." Also, he said, that he had experimented with good results with a sheet of iron across the smoke box just above the upper row of tubes; this reduced "the contents of the smoke box and consequently the amount of air to be lifted out." This permitted the lowering of "the blast pipe and substituting blast pressure for blast suction. I look to this plan as one likely to become generally applied." The views of Colburn were verified by experiments made in England by D. K. Clark, and in France by Le Chatlier, Flachat, Petiet and Polonceau. A record of the opinions of the French investigators will be found in the "Guide du Mecanicien Constructeur et Conducteur de Machines Locomotives."

"The dimensions of the smoke box should be, on principle, as limited as possible, for the immediate effect of the draught produced by the exhaust is to dilate the air comprised in its capacity; this rarefaction being operated by reason of the diminution of pressure which is the consequence of the draught, the hot gases which fill the tubes, and after them those which fill the firebox, rush into the smoke box to give place to the fresh air which the difference of pressure causes to pass through the grate and the fuel. It is evident that for the same action produced by the exhaust of the steam in the chimney, the dilation will be as much greater in the smoke box as the volume of the latter is smaller, and as a consequence the suction of air through the furnace will be more energetic. It appears, nevertheless, that there is in practice a limit to this reduction of the dimensions of the smoke box, below which it ceases to be advantageous."

A paper of importance on this subject was read before the Franklin Institute in 1879 by Mr. J. Snowden Bell, who has since that time been a strong advocate of short smoke boxes and has kept in touch with the recent changes, as will appear from his communication.

There are several theories about the action of steam jets in removing gases from the smoke box and producing a vacuum, all of which have strong advocates, and most of them have been put into practice with varying results. Each advocate holds that practical service has shown the truth of his particular theory, and the faults and hypothetical nature of all the other theories. Some of these theories are:

That the exhaust jet acts like a "momentum ejector," sometimes used in forcing water, and the exhaust steam mixes with the gases and gives them a velocity toward and through the chimney.

That the exhaust steam drags out the gases and knocks out the sparks by superficial and frictional contact at the outside surface of the steam jet.

That the exhaust jet acts like an ejector used to lift water and produces a suction by condensation and in some unknown way by velocity, and there should be a number of concentric ejector cones to increase the ejector effect.

That the exhaust jet acts like a piston in a cylinder, the smoke stack being the cylinder, and pumps the air and gases out of the smoke box, and in some unknown way the piston action continues even when the jet of exhaust steam becomes practically continuous as is the case at high speed. Of course, at about 40 miles an hour the piston continues, but on this theory it is supposed to pump just the same.

There are other theories that are more complicated and so difficult to express in mechanical English that we forbear attempting to do so. There is one important point, however, viz., the advocates of all these theories are split up into two factions, one of which declares that without the long smoke box there is no possibility of getting a uniform draught on the fire or of reducing the back pressure on the cylinders by the use of a large nozzle. The other faction declares with equal earnestness that with a long smoke box the pull on the fires is all at the front end of the fire box, and the large capacity of the long box requires a small nozzle to get sufficient draught, thus increasing the back pressure in the cylinders.

These are the theories in a general way that the Master Mechanics' Committee has to investigate, and it deserves the sympathy, commiseration and assistance of those who have to design and operate locomotives, and every man who goes to the convention this year ought to be prepared to discuss this subject. About all that is now known is that a low, large nozzle, with a medium size of stack and a short smoke box, will produce more draught with less back pressure on the cylinders than a high, small nozzle in a large smoke box. These are the two extreme constructions and the happy medium is yet to be struck.

Those who wish to further review the data on this subject will find interesting facts as to construction and some discussion in the *Railroad Gazette* for 1889, page 271; 1890, page 487; 1891, pages 61, 62 and 334; 1892, pages 149, 168, 201, 239, 275, 446, 450 and 540, and 1893, pages 682 and 844.

The Progress of Railroad Reorganization.

January 1, 1894, there were in the hands of receivers in the United States 42,417 miles of railroads, outstanding against which there was a capital stock of $1,830,259,000 and a funded debt of $1,116,167,000, a total of $2,946,426,000; and existing as claims against which there were many millions more in the form of defaulted interest, floating debt, receivers' certificates, etc. Of this aggregate not one system has been completely reorganized up to date, and yet it is probable that there is not one that will not be reorganized. Many of the roads in the hands of receivers have been more sinned against than sinners, and, although regarded as bankrupt, have not been placed there through bankruptcy. In the panic through which the companies have just passed credits were destroyed to such a degree that it was practically impossible for solvent roads to borrow money, and when the credit of a railroad system is destroyed there is but one thing left for it to do, seek protection of the courts. Public confidence has in a measure been restored, moreover, general business conditions are on the mend; these two facts are reflected in a general movement toward rehabilitation. The future of the properties will very largely depend upon the manner in which this work is executed. There are many abuses, the outgrowth of years of inflation, or the result of reorganization in former days to be corrected. If these are met squarely, while the properties are in a plastic state, the railroads of the country will be placed upon a sound financial basis; wherever patch work is done, and reorganization perfected with a view only to "put the load on some other fellow," the work will have to be done over again at no very distant day.

Primarily there seems to be a disposition among all interests to take into consideration the fact that the mortgage capitalization on the 6 or 7 per cent. basis must be changed. At the time these mortgages were issued the freight rate per ton per mile was say 100 per cent. greater than at present, and passenger rates were more remunerative. In the years which have intervened addtitional burdens in the form of new stock and mortgage indebtedness has been added, until many of the systems are found at the present day to carry a heavier mortgage debt than they are intrinsically entitled to; that the interest on such debt is out of proportion to the earning capacity of the road, and that so many mortgages have been placed ahead of the stock that the latter, while in reality controlling the policy of the company, oftentimes has little or no intrinsic value.

Considering the vast interests at stake the manner in which reorganizations now under way are being conducted, has a direct bearing upon those which are to follow, and both will directly influence the finances of the country, and a review of the work which has already been done in this matter of reorganization is pertinent.

There are no less than a dozen important reorganizations pending at this time. Principal among these may be mentioned Union Pacific, Atchison, Reading, Erie, Richmond Terminal, New England and Northern Pacific. The Richmond Terminal reorganization has been about perfected. Of the others only two have reached the stage of official plans.

The necessities of the various systems are so diverse that it is difficult to follow a common policy in treating them. At the beginning there was the customary bickering between the bondholders and stockholders as to which should bear the main burden of the reorganization. There was a general recognition of the necessity of scaling interest charges on the high-interest bearing bonds. The bondholders were naturally averse to any such procedure without an offsetting reimbursement. Stockholders, who in the majority of cases realized that they would be called upon for a cash assessment, felt that they also should be reimbursed. If this policy were carried out the offset for the lessened interest charges and for the cash would naturally have to be in the form of new security. An increase in the capitalization, no matter if it were offset by a correspondting decrease in fixed charges, or actual money put into the property is not, on the whole, considered desirable. Stockholders naturally desire to escape with as small an assessment as possible, while the bondholders who are really in control of the situation desire a good price for their bonds, plus defaulted interest, and in the case of a scaling of interest an equitable reimbursement. European capitalists who have exercised a strong influence and who are largely bondholders have taken the stand that the reorganization must be perfected principally at the expense of stockholders.

The first plan to be brought out which exerted an influence was that of the Erie company. This provided for a blanket mortgage of $70,000,000 covering the entire line, and bearing five per cent. interest. This amount is to take up outstanding issues and provide necessary funds for improving the property, care for the floating debt, etc. An assessment was not a feature of the plan. It was construed to be in the interests of shareholders and brought a strong protest from the second consolidated mortgage bondholders, who felt that the stock should bear the burden of the reorganization instead of having their lien made less valuable by an increase in the bonded indebtedness. Coming at almost the inception of the reorganization movement it had a marked influence in setting the pace and caused alarm among bondholders. The second mortgage bondholders formed a commitee for protection. The plan, however, was carried to an adoption, which fact acted as a check upon reorganization, causing bondholders to be more assertive as to their rights and creating more independence among the shareholders. It now appears that the adverse sentiment which it created has borne fruit, and that the plan is to be modified in a measure so as to give bondholders certain concessions. Messrs. Evarts, Choate & Beaman, counsel for the second mortgage bondholders, gave the opinion that interest could not be paid upon the new bonds until the old bonds were deposited, or unless the interests on the old bonds not deposited, were paid in full. If this opinion should be sustained by the Court it would mean that holders of bonds who refuse to consent to the reorganization are legally entitled to interest which no plan of reorganization by penalty for non-deposit can take away. The opinion coming from such eminent legal authority carried great weight, and the latest news is to the effect that the plans stated will be modified. This change has had a good effect upon the reorganization movement in general.

The next plan which had an influence beyond the property directly influenced was that of the New England company, brought out last week. The road is one of the few which was not placed in the courts in the hands of so-called "friendly receivers." The plan places the burden of reorganization upon the stockholders. It provides for an assessment of $20 on the common stock without any offsetting compensation; $25 on the preferred stock, and the scaling of interest charges on the bonds from 6 to 5 per cent., giving in connection therewith a cash offset. The plan was received favorably by all except the stockholders, and was construed as furnishing the keynote of successful reorganization. It said to the investment public: "If you, a shareholder, will permit the abuse of your property, you must stand the penalty." Its effect in other reorganizations is already being felt.

Among the great railroad systems to be reorganized the Union Pacific will perhaps be the next. There are at least half a dozen plans under consideration, but it is likely that none will be formulated until the Government debt is cared for. Attorney-General Olney proposes that Congress extend the debt of $50,000,000 held by the Government at 2 per cent., and that the first mortgage of $33,500,000—less $7,616,000 in the sinking fund to be cancelled—be renewed and extended at a rate of interest not greater than 5 per cent. If this measure is authorized the plan will soon make its appearance. A heavy assessment on the stock is one of its probable features. The cash paid in will get some kind of collateral as an offset, presumably preferred stock.

The Atchison reorganization has only just been commenced. A committee representing nearly all interests met last week for the first time. The road, considering that it is in the hands of a receiver, is in an easy financial position, and it is probable that it can be rehabilitated at the minimum cost to security holders. Bond-

holders appear unwilling to make concessions, and there is considerable talk of a $10 assessment on the stock.

Northern Pacific is in a state of hopeless demoralization, and it will probably be many months before the various factions can reach anything like an agreement. In fact it looks now more like war to the death than a compromise. Just at present the Villard interest, which has control of the receivership, but has been ousted from the offices, is seeking the support of bondholders, while the Brayton-Ives interest which, although in control of the offices of the company, has its hands tied by virtue of the existence of the receivership is trying to get rid of the present board as a step preparatory to the reorganization.

The Reading reorganization, which has been a byword in the world of finance for a year and a half, seems to be drawing to a head. It was recently placed in the hands of Drexel, Morgan & Co., after having been thrown up by the Manhattan Trust. Mr. J. Pierpont Morgan is now in Europe negotiating with the various bondholders. Last Saturday it was intimated by the committee of general mortagage bondholders that they would put out a plan in a short time or take some action looking toward the protection of the securities of that class. This we believe is a move independent of the Drexel, Morgan & Co. endeavors. The Rice party which is said to control about $20,000,000 of the various issues of bonds is also believed to be formulating a reorganization plan.

The Railroad Bond Market in April.

The market for railroad bonds during the month of April was a little less active than in March, but decidedly more active than in April, 1893. It advanced steadily throughout the month, which was noteworthy in view of the weak stock market. The receivership group was the only one which scored a net average decline. On an examination of the averages of the various bonds of that group, it will be seen that the movement was very irregular, the advances and declines each being pronounced. The various reorganization plans naturally discriminate between various classes of securities; this naturally affects prices. Of the securities in this group the Northern Pacific issues were the weakest. The cause was bad earnings and the lack of harmony among insiders as was reflected by the appointment of various opposing reorganization committees. Reading issues were very weak on bad earnings, for which the depression in the coal industry was largely responsible. A gratifying showing was made by the bonds of the Richmond Terminal system, of which the reorganization is almost completed. The water has been squeezed out of the system, and the pruning knife has left the remaining securities ripe for an advance. Kansas Pacific 1st Consolidated 6's lost 7⅞ points on the report that the interest due May 1 would not be paid until later in the month. The Atchison and the Union Pacific issues were in the main weak; this was partially due to rate wars.

Of the roads comprising the other group it can be said that very few first class bonds came out. There is little disposition to sell, as the money realized from such sales would of necessity be reinvested in railroad securities, or go to swell the already enormous bank surplus reserves. Outside of the receivership group the only bonds which have declined have been of a speculative character—in sympathy with the stock movement. Quite a number of bonds which sold ex-interest April 1, have more than recovered the amount.

The average changes of the various groups were:

Receivership group	declined	$ .27
Granger	advanced	.98
Trunk Lines	"	1.30
Southwestern	"	.51
Transcontinental	"	1.75
Coalers	"	.35
Southern	"	.82
Miscellaneous	"	.60
Average advanced combined list		.75

Very little can be said concerning the strength in the granger group. Business conditions have not materially improved in the middle west; and the appreciation in the values was undoubtedly on an investment demand. Nearly all the issues are selling above par, and many have reached a point where they are no longer a profitable investment, except from a standpoint of security. The same can be said in a general way of the trunk line issues. Certainly the trunk line situation, during the month, did not develop features favorable to the properties. On the contrary several meetings of the presidents and traffic managers failed to restore order. Should the present demoralization continue it will be reflected in the movement of the securities next month. Of the Southwestern group the most notable strength was developed by Missouri Pacific on favorable earnings. All the Southwestern roads are making good showings in gross earnings. Wabash was strong on the exchange of the 7 per cent. bonds due next year for Wabash 1sts.

The prolonged depression in the coal trade, and the small margin of profit on the business now being transacted, acted as a damper on coal bonds. Other things being equal they are as good a security as some of the Western bonds which had sharp advance during April. The relative importance of coal bonds, in the estimation of investors, as a security, as compared with coal stocks, is in shown the fact that the bonds made an average advance of 35 cents, while the stocks of the same roads, with the exception of Delaware & Hudson, all showed declines.

The showing made by the miscellaneous group is significant chiefly in that 59 issues of almost all kinds, scored a net average advance of 60 per cent. There were but few marked changes as compared with the previous months, and the range of fluctuations was comparatively small. As exceptions we note a decline of 3½ points in Brooklyn Elevated and a decline of 3¼ in Hocking Valley 5's, and 1½ in Hocking Valley 6's on the bond issue mentioned in our last report, and the coal strikes.

In the large table herewith is given the range of fluctuations during April, inclusive of the 28th inst., together with the change from the previous month.

THE BOND MARKET IN APRIL.
Range for the month.

	High.	Low.	Last Sale.	Change from l'st Sale in March.
Roads in Receivers Hands.				
Atch., Top. & S. Fe 4s	76½	73¼	73¼	—3
" " " " 2nds A.	38⅞	33¾	33¾	—4¼
Colorado Midland 4s	32¼	29¾	30	—1½
Atlantic & Pacific 4s	53¼	51⅛	51½	+ ¼
St. Louis & San F. 2nds A	113	112½	113	+3
" " " " " B	113	112½	112½	+2½
" " " " " C	113	112	112½	+2
" " " " gen. 4s	51	49½	50	—1½
" " " " " 5s	84	82	82⅝	+1½
" " " " " 6s	98	97	98	+2½
East Tennessee 1sts	112⅝	111¾	112⅝	+ ⅝
" " ex gold	43	41	43	+3
" " 5s	101½	97	101½	+2½
Knoxville & Ohio 1sts	107¾	106	107	+2
Erie 1sts, cons	137	135	137	+2½
" 2nds	82	78	78	—6⅞
Northern Pacific 1sts	114¼	110⅝	111	—3½
" " 2nds	87⅛	84	84	—5¼
" " 3rds	64½	59⅞	60½	—3¼
" " 5s	33½	28⅞	28½	—5½
Northern Pac. & Mon. 1sts	38½	35	37½	— ½
Wisconsin Central 1sts	77⅛	75	75	—1¾
" " incomes	18	15	15	—2
Chicago & Nor. Pac. 5s	48¾	45½	46	— ¾
St. Paul & Nor. Pac. 1sts	117½	117	117	+1
Cleveland & Canton 1sts	79	74	75	+5
L. St. L. & Texas 1sts	61	58	60⅛	+1⅛
L. Evans & St. Louis 1sts	47½	45	47½	+2½
Peoria, Dec. & Evans 2nds	28¼	27	27½	+1½
Reading 4s	77	75	75	—2
" 1st incomes	38	34	34⅛	—2¾
" 2nd incomes	26¼	22½	22½	—2⅝
" 3d incomes	20½	17¼	17¾	—2¼
Rich. & W. P. T. 5s	27½	25¾	26	+2⅛
" " " 6s	57¾	52	56	+4¼
Rich. & Danville 1sts	116	115	116	+1
" " 5s	74	70	73	+3
Sav. & Western 1sts	51	47	48	—1
Union Pacific 1sts, '96	107	105¾	105½	+ ⅝
" " " '97	107	106	106½	+ ½
" " " '98	109	106½	107½	—1
" " " '99	111	109	111	+2¾
" " gold note 6s	92½	91¼	92	+ ¼
" " sink fund 8s	102	100¼	101	+ ⅞
Ore Nav. 1st 6s	109	108	108¼	— ¼
" " con. 5s	74	72	72⅝	— ⅜
Kan. Pac. 1st con. 6s	97	89⅛	89⅛	—7⅞
Ore. Short Line & U. N. con.	56⅛	54	54⅛	+ ⅛
Oregon Short Line 6s	91⅞	88	88	—2¾
Atch., Col. & Pac. 1sts	50	44¼	45	—3
U. P. D. & Gulf 1sts	48¾	45	46	— ⅝
Ft. Worth & Den. City 1sts.	79⅞	76	76	—2½
W. N. Y. & Penn. 1sts	101½	100	101⅛	+ ½
" " " 2nds.	21⅞	20½	20⅞	+ ⅞
Average decline, .27.				
Grangers.				
Chic., Bur. & O. conv. 5s	105	104	104	— ½
" " " 7s	122¾	121¼	122½	+ ¾
" " " deb. 5s	102½	100¼	101½	—1
" " " Neb. div. 4s.	92½	91¼	92¼	+ ¾
Rock Island 6s	129	126	126	—1
" " deb. 5s	95	93¾	93⅞	— ⅛
" " ex. 5s	104¼	102⅜	103¼	+1¾
St. Paul '73-10 5s	122	120¾	120¾	+ ¼
" " Terminal 5s	109	108¼	108¾	+ ¼
" " cons. 7s	130½	130	130	+1
" " gold 7s	128	126¼	127	+1
" " H. & D. div. 5s	106	104	105¼	+1¼
" " Dak. & Gt. So. 5s	106¾	105	106¾	+2¾
" " Chic. & P. W. div. 5s.	111½	110	111½	+1
Milwaukee & North 1sts, 1910.	116½	115	116½	+2½
Northwest S. F. 5s	110	108½	109¾	+ ¾
" " " 6s	121	120	120	+4
" " " con. 7s	141	140	140	— ½
" 25 yr. deb.	109½	108½	109	+1½
" 50 yr. deb.	107½	107	107¼	+ ¾
" gold bonds	125½	124½	125½	+2
Average advance, .98.				
Trunk Lines.				
Penn. 4½s, reg.	108¾	106	108½	+1½
P. C. V. & St. L. 4½s "A"	103	101⅝	103	+1⅛
Lake Shore 2nd 7s	124½	124	124½	+ ⅛
Mich. Cen. 7s	124½	123¾	124	+ ¼
N. Y., Chic. & St. L. 4s	100½	98½	100½	+1⅝
N. Y. Central 1st 7s	126½	126	126½	+1½
" " deb. 5s	108½	108	108⅞	+ ⅞
N. Y. & Harlem 1sts	124½	123	124½	+4½
West Shore 4s	106	104⅛	105	+ ¼
Average advance, 1.30.				
Southwestern.				
Int. & Gt. Northern 1sts	116	113	115½	+4
Kan. & Texas 4s	83¼	82¼	82½	——
" " 2nds	48½	45	45	—2¼
Mo., Kan. & East 1sts	81¼	80⅝	80⅝	+ ¼
Missouri Pacific con.	101¾	101	101½	+2½
" " col. tr. 5s	75	70	70	+1
Iron Mountain 1sts	103	102½	102¾	+ ¼
" " 2nds	109	107	108	+1
" " 6s	81	77¼	80⅝	+3½
Pac. of Mo. 1sts	100½	100	100	+ ¼
" " " 2nds	106½	106	106½	+2
St. Louis Southwestern 1sts.	62½	60	60	—1½
" " 2nds.	20¼	18	18	—2
Texas & Pacific 1sts	85	82¾	83	+1½
" " 2nds	26½	23¾	24	—1
Wabash 1sts.	107½	106	107½	+1¾
" 2nds	79½	74	77⅝	+2⅝
" "B" deb.	28⅞	25½	25½	—1½
Average advance, .51.				
Transcontinental.				
St. Paul M. & M. Cons. 6s	121	120½	121	+ ½
" " " 4½s	101⅜	100½	101⅜	+ ¾
" " " Mon. Con. 6s.	115⅝	115	115	+3½
" " " Mon. ex. 4s	89½	87½	89	+3
" " " Dak. ex. 6s	121	119¼	120¾	+1
Average advance, 1.75.				
Coalers.				
Jer. Central gen. 5s	115½	114	115½	+1⅝
Lehigh & Wilk. con. assn'd	09¼	108½	109½	+1¼
N. Y., Ont. & West. 4s	85¼	84	84½	+ ½
" " " con. 5s	109⅞	109	109¼	+ ⅛
N. Y., Sus. & West. gen 5s	95	92½	92½	—1½
" " " funding 5s.	107½	106¼	106¼	— ¾
Average advance, .35.				
Southern.				
Lou. & Nash. gen.	117	116½	117	+1
" " gold 4s	77½	76	76	— ¾
" " 5s	99	97½	99	+2½
" " con. 7s	109⅝	109¼	109½	— ½
Nash., Chat. & St. Louis 1sts,	129	127½	129	+2
" " " con 5s.	101¾	100	101	+1½
Average advance, .82.				
Miscellaneous.				
Am. Cotton Oil 8s	114	113¼	114	+ ⅞
Am. Dock & Imp. 5s	111⅛	110	110	—1⅛
Brooklyn Elev. 1sts	100¾	100	100	— ⅜
" " 2nds.	74	70½	74	+3½
Bur., C. R. & Nor. 1sts.	107	105¾	107	+1½
" " " C. T. 5s.	96¼	95¼	96⅛	+ ⅞
Ches. & Ohio con. 5s	106¾	105¾	106⅝	+ ⅞
" " gen. 4½s.	77¼	74½	74½	—2¼
" " R. & A. 1sts	92¼	91	91⅞	+ ⅞
" " R. & A. 2nds.	87	85¾	85¾	—2⅛
Cin., Day. & Iron 1st 5s	100½	98½	100	+1½
Can. South 1sts	110¼	109⅛	110¼	+ ½
" " 2nds	105¾	104	104½	+ ¾
Chic. & East. Ill. gen. 5s.	101⅞	101	101¾	+ ¼
Chic. Gas, Lt. & Coke Co.'s 5s.	85	82	83½	— ⅛
Consumers' Gas of Chic. 5s	83½	80	81	—1
Denver & Rio Grande 4s.	79	77½	77½	— ½
Det., Mac. & Mar. Ld. Grants.	27½	24½	24½	+1¾
Dul. S. S. & Atl. 5s	102	99	102	+2¼
Ed. Elec., Ill. 1sts	107¾	105	107	+1¾
Eliz., Lex. & D. S. 1sts.	99⅞	99	99¾	+ ¼
Fulton Elevated 1sts	83	80	83	+ ⅝
General Electric deb. 5s	87½	83	87	+4
Hocking Val. 5s	87	83	83¼	—3¼
" " 6s	90½	88	89	—1½
Hous. & Texas Cen. 1sts	107	105½	106¼	— ¼
" " " 4s.	65	64½	64¾	—1¼
Iowa Central 1sts	95	93½	93¾	+ ¼
Illinois Cent. 48s, 1953	100½	97⅞	100½	+2⅝
Kanawha & Mich. 4s	76⅞	74¼	75	——
King's County Ele. 1sts	85	81	84¾	+3¾
Lake Erie & West. 1sts	115½	114⅛	115	+1¼
" " " 2nds.	102¾	101½	102¾	+1½
Lou., N. A. & Chic. 1sts	114	110	110	—2
" " " gen	69½	66⅝	67½	—1½
" " " con. 6s	98	9	96	—1
Laclede Gas 1sts	89	86	87½	+ ½
Long Island 4s	97	96⅝	96½	+1
Manhattan Railway 4s	96½	95¾	96¼	+ ¾
Met. Elevated 1sts	120	119⅛	119⅝	+ ⅝
" " 2nds	111	109⅝	111	+1¾
Mil., L. S. & West 1sts	130	128¼	128¼	— ¼
" " " " Ext.	109¼	108¼	109¼	+1¼
Mex. International 4s	75	68⅝	73½	+5
Mobile & Ohio gen.	62	59½	60¾	+1¼
" " new	116	115	115¾	+ ¾
Ohio Southern 1sts	95½	93½	94⅜	—1⅛
" " 2nds	44	43	44	—1
Oregon Improvement 5s	58	55½	56	— ½
" " 6s	103	100	103	+3
Peo. & Eastern 1sts	77	74	77	+2
Pitts. & Western 1sts	88	85¼	87½	+4
Rio G. Western 4s	71	68⅛	68⅛	— ⅞
San An. & Ar. Pass 1sts	59⅝	57½	57½	+ ½
Third Avenue 1st 5s	116	114¼	116	+1½
Tol., P. & West 1sts	84	83¼	83¼	— ¼
Va. Midland gen.	90	88	89	+1
Union Elevated 1sts	98	97	98⅛	+1

Six-Wheel Tenders on American Tracks.

A correspondent from New South Wales writes as follows about six-wheel tenders, the use of which has been proposed in this country and has been seriously considered by at least two railroads within a year: "In a paper before the Engineering Congress last year Mr. D. L. Barnes says, taken all together, the foreign tender—six-wheel—appears to be more practical than the American, and the service trial of one with the Webb compound on the Pennsylvania road during the past two years has led some of our railroad engineers to recommend an extensive trial of six-wheel tenders in the place of eight-wheel, in order to gain, if possible, the greatest simplicity and accessibility and the less weight of the foreign tpye. Now this is no doubt true where their use is confined to first-class roads, but judging from our experience—New South Wales Government Railways—the six-wheel tenders are anything but satisfactory when the road gets in indifferent order, and our record of derailments shows that the larger portions are of vehicles of the six-wheel type; in fact, to the best of my recollection, we have more derailments with six-wheel tenders than any other type of vehicles. I am convinced by my journey through the States that the successful operation of your earth tracks is entirely due to your sensitive equalizing gear on engines and the use of the bogie truck. With six-wheel tenders and four-wheel wagons many of the roads I traveled over could not be operated without constant derailments."

The opinion of our correspondent has been reviewed by a mechanical engineer of a prominent United States railroad on which both four-wheel and six-wheel vehicles have been running. His opinion is important in view of the tendency toward the introduction of six-wheel tenders on some Western lines. He says: "We have run both four-wheel and six-wheel carriages over our lines without the slightest difficulty. The four-wheel carriages are represented by our dynamometer car, which often has run in high-speed passenger trains, and also by our cabin cars, of which we have a great many; these of course run in freight trains, but on some portions of the road freight trains are run at pretty high speed, probably fully as high as the passenger trains on the New South Wales railways. We have had no trouble with either. To the best of my knowledge there has not been a single case of derailment of either four or six-wheel vehicles, and had there been I would surely have heard of it. In the six-wheel tenders additional end play is given to the middle axles, the same as in the six-wheel trucks. This is obtained by making the middle brasses slightly shorter to the extent of about 1-4 in."

We stated last week on the strength of a press dispatch that the United States Marshal had captured the men who stole an engine and several cars of the Northern Pacific road and ran for over 300 miles in total disregard of the rules of the road and of the safety of life and property, but it appears that the report was premature. In point of fact the marshal and his deputies were surrounded and intimdated by the mob and one or two men were wounded by pistol shots. But the United States troops from Fort Keogh had already been ordered out, and they captured the train at midnight on the night of April 26, at Forsyth, Mont., 337 a miles from Butte. A large number of the men were asleep in the cars and they were

surrounded without difficulty. There were about 500 men in the mob; 100 of them escaped to the woods and the rest were turned over to the United States Marshal the next day. Only three revolvers were found on the prisoners. A number of the leaders will be tried in the United States Court at Helena, Mont., but at last accounts the most of them were detained by the soldiers, no decision having been reached as to what punishment should be inflicted.

The Coxeyites have continued to troulbe the railroads all they dared to during the past week. The main body has reached Washington, but has gone on foot, not troubling the railroads. At Washington C. H., Ohio, Calvin's "army" overpowered the men on a freight train of the Baltimore & Ohio and tried to ride to Columbus, but the conductor put his train on a side track at Mt. Sterling, where the law breakers were captured by four companies of State militia, who were ordered out by the Governor. Near Brazil, Ind., on the 25th, Frye's gang seized a second freight train. The gang under Kelly in Iowa seems to have made little progress. A dispatch from Des Moines said that the railroads had run all their spare rolling stock out of the city. At Troutsdale, Ore., an army took possession of the Union Pacific station, driving out the agent and operator; but 50 United States Marshals were promptly sent out from Portland and seem to have driven off the marauders. They continued to make trouble however and one report says that they uncoupled an engine from the General Manager's special train and ran away with it. A report from Portland April 29 says that the marshals finally captured 35 out of 507 men and took them back to Portland. Fifty of the ringleaders were placed in jail, but on trial for contempt of court (the road being in the hands of the court) they disclaimed knowledge of any order and said they intended no contempt so the judge set them free. At Seattle and Tacoma, Wash., a large number of deputy United States Marshals were called out to guard the trains of the Northern Pacific, several hundred men being gathered at different points in that region with the hope of getting a chance in some way to ride eastward. At the Meadows, west of Jersey City, a hundred tramps congregated one day last week and took possession of a train of empty frieght cars in the Pennsylania yard, but when the yardmen started to pull the train to a place nearer the police station the men suspected what was up and ran away before the policemen could be brought to the scene. Near Lima, O., about 300 tramps gathered close to the track of the Pittsburgh, Fort Wayne & Chicago, but it does not appear that they succeeded in capturing any train. A gang of tramps captured a freight train on the Concord & Montreal, near Concord, N. H., on April 29, and had their own way with it for a time. A car in a freight train on the Chicago, Burlington & Quincy was boarded by a band of twenty-five tramps at Ottumwa, Ia., last Sunday, and when the trainmen attempted to cut out the car they were confronted with revolvers. The conductor carried the men to Fairfield, where the police, after a struggle, cut the car out and left the men on a side track. A party of fifty-five "industrials" captured a freight train on the Atlantic & Pacific at Barstow, Cal., on Sunday. A deputy sheriff arrested the whole crowd and released the train.

One "army" went east from Columbus, O., on Monday last over the Baltimore & Ohio in passenger cars, sufficient money having been collected to carry them to Benwood, W. Va.

"Color Vision" is the subject of a report recently issued by the British Board of Trade showing what the Board has done during the last year and a half toward improving the methods of the railroads of the United Kingdom in examining employees for color blindness and other defetcts of vision; and the results appear to be very satisfactory. Although the principal roads have had some sort of an examination for color blindness for many years, a good many of them have used methods far from scientific. As in this country, the managers seem to have realized in some degree the necessity of looking out for this danger, but at the same time the apparently doubtful nature of some of the evils due to color blindness led them to yield to the prejudices of enginemen and other employees who feared that the test would throw them out of employment or at least injure their standing. This was shown in a report made by a committee of the British Medical Association in 1892 and referred to in the *Railroad Gazette* on July 1 and July 8 of that year. On August 31, 1892, the Board of Trade sent to each of the railroad companies an elaborate recommendation of scientific tests, with arguments showing their necessity, made by a committee appointed by the Council of the Royal Society and, to use a bit of American slang, asked the roads what they were going to do about it. The replies to this question constitute the bulk of the report now issued; and they show that practically all the important companies have concluded to adopt scientific methods; that is, to use Holmgren's test for color vision and the simple dot test or Snellen's types for far sight. Some of the roads seem to have complied rather reluctantly and the dilatoriness of many of them in replying seems to be the reason why this report appears nearly two years after the subject was first presented. The dot test most in favor is that based on the card issued from the Horse Guards, by Professor Longmore, in 1868. This card, as adopted on the Lancashire & Yorkshire, is shown in the report. A space 2 in. x 4 in. is divided into squares 1-5 of an inch square and 18 of these squares, irregularly selected, are blackened. On the same card are a red, a green, a blue and a yellow disc each 1¾ in. x 2 1-4 in. Candidates must be able to count the dots, in various positions, at 15 ft. with each eye separately, the other eye being covered. The distance, 15 ft., is equivalent to a distance of 1,800 ft. with a disc of 2 ft. square.

"Railroad managers are disposed to give the transportation of circuses and menageries the cold shoulder, as in the long run nothing is made in handling the business. A damage suit in which a circus company gets $30,000 takes more than the entire profits of handling the business for a series of years. It has been the custom for years to give special rates to this class of the traffic, and there has been a good deal of effort to secure it, but now the business is not sought for so eagerly. The menageries carry a high-class freight; they have valuable animals imported at great expense, and if by chance there is a wreck and any of the animals are killed or escape, the loss is enormous. The trunk lines have ceased to give reduced passenger rates for a distance of 75 miles on roads centering at a town where a big circus gives an exhibition."—Exchange.

All of which sounds as though it had been slightly tinctured with fiction to make good copy before it was printed. As for the passenger rates for the general public, the reporter may rest assured that as a general thing the railroads will reduce them as long as reducing tends to make more people travel. The fact that a dead tiger or snake has had to be paid for does not make the railroad manager feel any grudge toward the country boy who wishes to visit the circus. Damage suits are unpleasant, to be sure, but they happen around just the same when regular rates are charged, and the railroads are hardly yet prepared to refuse to carry the circuses when they tender tariff prices. Whether to reduce or not depends, therefore, largely upon competition, and the circus people probably know pretty well how to present that argument even when they want to go to a non-competitive station. The real reason for not encouraging the circus business on railroads is that circuses so often have poor cars, poor brake-rigging and poor couplers. To travel conveniently a circus must have its own cars, and as the proprietor generally is not a graduate of an advanced M. C. B. school he often "gets stuck" in buying his cars and their fittings. So a train of circus cars, especially if they have seen 15 or 20 years' service before they were reduced to the social level of a circus, is pretty sure to demand the gentle offices of the inspector very frequently; and the only way to run them safely is to put on a very good crew and have them run slowly. It will not do for the railroads to freeze out the great American circus, for it is too near the people's hearts. If they did, the anti-pooling law would not be repealed for a hundred years.

The enormous cost of doing business in a great city is illustrated in the recent action of the Pennsylvania road in building a new shed and delivery station at Bay street, Jersey City, at an expense of $100,000 or more, for handling the fruit and vegetable business, which has outgrown the existing facilities on the New York side of the Hudson River. Additional ground at the wharves is practically unobtainable at any terms, and yet this fresh produce must be handled promptly or not at all. In the height of the season, when both fruit and vegetables come in from the South by the train-load, 200 cars a day are delivered at Jersey City, and a very little delay is often sufficient to keep a shipment out of the market for a whole day. But though the railroad company has thus gone to great expense to provide conveniences it meets with vehement remonstrances from a few produce dealers who find it inconvenient to go to Jersey City to receive their freight. They complain that the expense and time necessary to cross the river are intolerable, that the location of the piers heretofore used (near the piers of other lines) made a union market, which buyers attended, thus saving one cartage, and that this change establishes a second market, which is an irremediable injury to their trade. These seem to be good arguments, by themselves, but rather short sighted. It is desirable to have all the sellers and all the buyers get together at one place and that place should be a convenient one; but the city cannot go on growing forever and still do business in the same quarters, and the simple question was how long before the delays and expense due to overcrowding would become more troublesome than a journey to a new location. The railroad has simply foreseen the future and provided for it, and has taken this action a little too soon for the convenience of a few consignees. But the change would have to be made some time and some one would have to suffer a little, however long it were postponed. The same remonstrances were presented at Philadelphia a year ago when the Pennsylvania established a similar station a mile or two west of the old delivery station, but there, as in New York, the majority of the consignees acknowledged the necessity of the change and now they have all adjusted their business to it.

A group of statements has been for some months going round the press to the effect that a report of the working of the electric lighting system on the trains of the London, Brighton & South Coast Railway for the last 12 months has been extremely favorable; that this system has been found to be more serviceable than lighting by gas and less expensive; that the cars electrically lighted are always ready to go anywhere and do not need to go to the gasing station to be recharged, and that consequently they give about 15 per cent. more car milage than the cars lighted by gas. It is said that this report shows that the first cost of equipping the London, Brighton & South Coast trains is cheaper for electric lighting than for gas; that the dead weight to be hauled is less, and that the cost of maintenance was very much less than either oil or gas lighting. It is doubtless well known to most of our readers who have looked into this matter at all, that the system of electric car lighting in London on the London, Brighton & South Coast Railway is by taking power from an axle of a car and generating electricity by a small dynamo. We suppose it must be well known also that this is no new thing on the London, Brighton & South Coast, but has been going on there for at least 10 years. It is strange, therefore, to find these statements with regard to the success of the method appearing suddenly and in so many different quarters as if it were some brand new thing. It is still more strange that with this great success the method should not have been adopted long ago on the Brighton Railway. As a matter of fact, a small part of the passenger stock of that railroad is fitted with the electric lighting device, and we have the following cable despatch from the Pintsch Company, in Berlin, "Brighton report false. Are erecting three oil gas works and fitting 1,665 coaches for oil gas, electric light being too expensive and troublesome." We can only give this dispatch for its face value, but we interpret all of it as applying to the Brighton Railway.

The Webb & Thompson train staff apparatus is now in use in the United States, the Chicago, Milwaukee & St. Paul having lately introduced it on the bridge over the Mississippi River at Savanna, Ill. About three miles of the line at this point is single track, and while the train movement is considerable, the expense of building a second track would be excessive. The apparatus is of the latest form, like that shown at the World's Fair, and differs from that shown in the *Railroad Gazette* of August 1, 1890, in having one staff which is connected with the machine in a manner different from that followed with the others and in which there are six tablets. This is used for running a number of trains one after another in the same direction when it is desired to suspend the absolute block system, the latter being maintained invariably when the ordinary staffs are used. After the permissive staff has been taken out it is impossible to take out one of the others from the pillar at either end of the road until the permissive staff and all the tablets have been replaced in one pillar or the other. The regular block signals heretofore in use at the termini of this single track, Savanna and Sabula Junction, will be continued in operation, and whenever the operator in charge permits trains to follow each other permissively he will leave the signal standing at danger. The possession of the permissive staff, which is painted green and is otherwise different from the other staffs, gives authority to pass the block signal at danger. The Manual of Instructions, issued by Superintendent C. A. Goodnow, gives a brief description of the principles and very clear rules prescribing the mothod of operation. Superintendents will watch the operation of this "installation" with much interest. The question whether the staff system necessitates more delays than a hustling American railroad can put up with, ought to be here settled in a satisfactory manner. While the business over this bridge is not so large as on some other single tracks, the place is so near Chicago that we may be sure there are "no flies" on the men who handle the trains, and if they think there is any deficiency in the system they will be able to let us know of it. With the experience with the staff system for fast trains reported from the other side of the world, and especially since the simple exchanging apparatus described in the *Railroad Gazette* of April 20 has been successfully used, the question whether or not one can use the safest possible system for operating the space-interval on single track roads becomes quite simple.

Probalby the wildest electric railroad scheme of all is that of a certain alleged "National Rapid Transit Co.," which has been brought before the House Judiciary Committee by Mr. Hemphill, ex-chairman of the District of Columbia Committee, and of the House of Representatives. This company asks for a charter authorizing the construction of an elevated electric railroad between New York and Washington. It is proposed to carry passengers, mails, and eight freight cars on each train, and to cover the distance in about two hours, say an average speed, including stops, of at least 112 miles an hour. We are informed that the committee seems to think favorably of the scheme. We are sorry to be obliged to think so ill of the intelligence of the comimttee, but it is a good thing for people to get themselves classified before the world, and the Congressional committee that would report favorably upon such a scheme would certainly classify itself in the estimation of intelligent people.

Western papers report that the Pullman Palace Car Company has done a handsome thing for the 650 conductors and porters who have worked for the company five years or more. The men are to have a badge of honorable service, to be worn upon the left sleeve of the uniform, which will consist of an embroidered bar, gold for conductors, and silver for porters, and an additional bar for each additional five years of service; and each conductor or porter who has served 10 years or more will be presented with two uniforms a year by the company. It is stated that 14 conductors and 31 porters have been in the serice 15 years, 11 conductors and 15 porters 20 years, and one conductor 25 years.

NEW PUBLICATIONS.

Progress in Flying Machines. By O. Chanute, C. E. Octavo, pages 308, index and numerous illustrations. New York: The American Engineer and Railroad Journal, 47 Cedar St. Price $2.50.

The publisher states that this book "gives an historical review of the effects (efforts) and experiments of inventors to accomplishing flight with apparatus which by reason of its rapid movement will be supported by the air as birds are. The author has gathered all the records of such experiments which were accessible and endeavored to show the reasons for their failure." He concludes that we may reasonably hope eventually to fly through the air. The book consists of a series of articles which appeared in the pages of teh *American Engineer and Railroad Journal* in some 27 different issues, beginning with that of October, 1891.

To the man who is curious in keeping track of the activities of the human mind as well as to the man who is seriously working at the question of how to fly, the volume will be very interesting, for it is a record of ingenious experiments in a subtle and difficult study. As the author says, the first inquiry will probably be "as to whether we know just how birds fly and what power they consume; and the answer must be that we as yet know very little about it. Here is a phenomenon going on daily under our eyes and it has not been reduced to the sway of mathematical law." In fact so little is known about flying that one is bound to think that the final success of the flying machine is rather an article of faith with the student of aeronautics than the result of scientific conviction; and when an engineer of experience and responsibility says that we may reasonably hope eventually to fly through the air we are inclined to take his statement very strictly, and not attribute to it anything that the exact words do not warrant. So perhaps he means that while we may hope to fly through the air, we question very much if he means that we may hope ever to do so as a successful commercial undertaking.

TECHNICAL.

Manufacturing and Business.

J. A. Fay & Co., of Cincinnati, report the sale last week of five of their 42-in. sand papering machines known as the "New Conqueror." From the inquiries received in regard to this machine they expect the demand for it to be extraordinary.

Thompson & Inness, dealers in railroad equipment and agents of the American Wire Glass Manufacturing Co., and of A. Whitney & Co., of Philadelphia, have removed their office to the Havemeyer Building, 26 Cortlandt street, New York.

The Charles Scott Spring Co. has removed its St. Louis office from 121 Laclede Building to No. 1417 Union Trust Building, St. Louis.

The American Steel Casting Co. has opened an office in the Monadnock Building, Chicago, for the purpose of facilitating the transaction of business with their Western customers. The company now have works in operation at Syracuse, N. Y., Thurlow, Penn., Norristown, Penn., Sharon, Penn., and Alliance, Ohio, and are prepared to promptly execute orders received.

New Stations and Shops.

The extensive improvements of the Pennsylvania Railroad at Elizabeth, N. J., are to be completed this year by the building of a new station at that city. Last week it was announced that the officers of the company decided upon the site for the new station, selecting the location on which the present station stands for the new building, which, it is believed, will cost about $70,000.

The officers of the Kansas City, Osceola & Southern have decided to build new shops at Clinton, Mo., and intend to begin the work at once, and to have the shops completed and ready for occupancy within four months.

The Berlin Iron Bridge Co., of East Berlin, Conn., is putting up a new transfer station for the Washington & Georgetown Railroad Co., at Washington, D.C. The same company is putting up an iron and steel buildiing, seven stories high, for James Pettit of New York City..

The Batopilas Mining Co., of Chihuahua, Mexico, has placed an order for four iron buildings and four bridges with the Berlin Iron Bridge Co., of East Berlin, Conn. These buildings are to be shipped by steamer to Galveston, Texas, from there by rail to the interior of Mexico, where they must be carted a distance of 100 miles on mule back up into the mountains.

The Canadian Pacific Railroad Company will build new stations at Pembroke, Renfrew and Aronprior, Ont.

The Heilmann Electric Locomotive.

We have repeatedly mentioned the trials of the Heilmann electric locomotive near Havre. It appears now that the Eastern Railroad of France has undertaken to put this locomotive into regular service. The "Journal des Transports" say that every day one or more trains will be hauled by it between Paris and Nantes.

Enlargement of the Gare du Nord, Paris.

The work of enlarging the Gare du Nord, Paris, goes back to 1884 and 1889. The aim in what has been done was to increase the number of tracks from 8 to 18. Since that work was completed connection has been made with the belt railroad (Ceinture) and now eight trains an hour enter or leave the station in this service, which did not exist before Aug. 1, 1893. Furthermore, the lowering of rates has, while perhaps diminishing receipts, increased the movement of passengers, and the number departing from this station has risen from 9 millions in 1884 to 16 millions in 1893. The trains arriving and departing were 240 in 1884, 400 in 1889 and 600 a day in 1893; on certain days there are 650. The total engine movements amount to at least 1,500 a day. It has therefore become important to further increase the station, making of it a head station like the great English and American terminal stations, and the Council of the Northern Railroad Co. has voted 7½ million francs to carry out this project. The tracks will be increased to 27 in number, and the change will involve a considerable re-arrangement of the halls and offices of the station as well as a re-arrangement of signal-houses and the like outside.

Pintsch Gas in California.

The gas-making and compressing plant of the Safety Car Heating & Lighting Co., at West Oakland, Cal., was put in service last month. It is to supply gas to the passenger cars of the Southern Pacific Co., and it is expected that all the cars entering Oakland will be supplied from this plant as fast as they are equipped. The plant has a capacity, when fully developed, of about a million feet a month. This is the first plant in California, but it is said that negotiations are in hand for one at Los Angeles.

Engine and Tender Hose Connection.

The designing and making of an extra strong hose that will not collapse or kink and break or shut off the injector when rounding a curve or striking a low point is a recent suggestion of the superintendent of motive power of one of the largest roads in the country, and within a short period this form of protected hose has attained extended use. It is corrugated, made of three and four plies of duck, with a wire spirally inserted. The outside is covered with a canvas jacket to prevent oil and grease from destroying the hose. It is made of any size or length, with about 2½ in. of plain hose at the ends to be strained and clamped to the fittings. It is named "Anaconda," and made exclusively by the Peerless Rubber Manufacturing Co., of New York.

The "Gigantic" Wheel.

A company has been formed to construct and work in London a wheel suggested by the famous Ferris wheel of the World's Fair. Engravings and a description of this wheel appear in *The Engineer* of April 20. The wheel is to be 300 ft. in diameter, that is, 50 ft. larger than the Ferris wheel. It is to be built from designs by Lieut. J. W. Graydon and the contract for building it has been let to Mr. W. B. Bassett, Managing Director of Messrs. Maudslays' Sons & Field. The wheel is to be erected at Earl's Court, and it is expected to have it working by the end of June. This wheel will be carried on two towers 175 ft. high, which will have on top and at three intermediate stages of their height, galleries and balconies to be used for restaurants and various amusements. The towers are connected by a passage through the axle itself. The axle will be 7 ft. diameter and be built of mild steel bars and plates. The axle of the Ferris wheel, it will be remembered, was a solid steel forging 32 in. diameter. The Ferris wheel is driven by a cast iron spur rack near the circumference which is actuated by a chain driven by a steam engine. The "Gigantic" wheel will be driven by a steel wire hawser, 1⅞ in. diameter. There will be one hawser on each side of the wheel, passing around grooves on the sides of the wheel where it is 195 ft. in diameter, but it is proposed to use but one hawser at a time. The motive power will be from two 50-H. P. dynamos, one of which will be held in resesrve. The towers are being built by the Arrol's Bridge & Roof Co., of Glasgow. These stand in fair ground of sand and shingle and the foundations will be of concrete 15 ft. deep. Each leg will be anchored to the concrete foundation by eight steel bolts 2 1-4 in. diameter and 12 ft. long. The axle is being made at Messrs. Maudslay's works and the cars are being built by Messrs. Brown, Marshall & Co., of Birmingham. Of these there will be 40, each 25 ft. long, 15 ft. wide and 10 ft. high, accommodating 40 passengers. There will be eight stages from which they can be entered. The illustrations in *The Engineer* gave only the most general notion of the framing and construction of the wheel.

Interlocking.

The Union Switch & Signal Co. has put in interlocking switches and signals at the Laughlin Y on the Pittsburgh Junction road at Pittsburgh. The through trains running over the Baltimore & Ohio and the Pissttsburgh Western will now be able to get through Pittsburg more quickly than heretofore as the contsruction of this Y obviates the necessity of switching at that point.

The Philadelphia & Reading has contracted with the Hall Signal Co. to erect Hall automatic block signals on the line between Fairmount avenue, Philadelphia and Jenkintown, about 10 miles. Wilson's arrangement of circuits is to be used, holding signals in the danger position except when a train approaches. The switches, of which there are a large number, will be connected in the usual manner. There will also be a new interlocking plant near Huntington street, with a 24-lever machine. This portion of the Reading has a large number of suburban passenger trains and is also the main line traversed by the fast trains between New York and Philadelphia. The Hall Company has now taken contracts for equipping over 100 miles of road since the close of the World's Fair, 11 miles having been equipped on the Chicago & Northwestern, near Milwaukee, early in the winter, and the recent contracts on the Lehigh Valley, the Delaware, Lackawanna & Western, and the Delaware & Hudson, aggregating about 84 miles.

A Station Indicator on the London Underground.

Whoever has traveled by rail in England will remember the more or less serious inconvenience of having to watch for his own station, there being no way of announcing stations in the compartment carriages. Even the very indifferent elocution of our standard trainman is better than no announcement at all. The difficulty of knowing where you are is especially great in the suburbs of London and on the Underground, for everything around the station platforms is covered with advertising signs, and the incidental stranger looking out for information will be surprised to learn that he has arrived at Lenox Whiskey or Owl Pens. The British Board of Trade requires that the names of stations shall be shown on boards on every platform, and on the platform lamps, but the humble station names are quite overshadowed by the advertisements and the lamps often get turned the wrong way. An arrangement is now undergoing trial on the Metropolitan District Railway in London, which, if it proves efficient and satisfactory in working, will be of some interest to Americans, who have also tackled this problem from time to time. It is a station indicator which is attached to the roof of each compartment of the carriage and shows in plain letters the name of each station as the train approaches it. The indicator is worked from a lever which is fixed to each carriage, underneath the running board. At suitable points between each pair of stations a double incline has been established beside the rail, and it is through the contact of the levers with this incline that the indicators in the carriages are actuated. When the indicators change, electric bells are rung to announce to passengers that the name of a new station has been displayed. This apparatus has been tried with satisfactory results on a train of the Metropolitan District.

The Butler Draw Gear.

The Butler Draw Bar Attachment Company have sent to their patrons a blue print of their draft rigging as it has been improved and strengthened. The part that has received special attention is the No. 68 yoke attachment whose shape and re-enforcement give it great strength. Compared with the pattern made by the company two years ago, the draw-timber bolts have been made ⅞ instead of ¾ inch. Some of the dimensions have been slightly increased where it was possible to make slight changes and not destroy the interchangableness of parts. The company adhere to the dead blocks which they have always used, and it is interesting that they now have many master car builders who agree with them in the practice.

The general arrangement of the rigging has not been changed, but is very nearly the same as illustrated in these columns two years ago.

THE SCRAP HEAP.

Notes.

William Syres was sentenced to two years' imprisonment at Richland, Wis., on April 2, for attempted train wrecking.

The Florida Engineering & Construction Co., of Chicago, has been incorporated by Daniel E. Ryan, Albert T. Otto and Morgan Cowan.

It is stated that the accommodation train of the Lake Shore & Michigan Southern which arrives at Buffalo at 12:45 p. m., has arrived on time every day since July 1, 1893.

The insurance department of the Brotherhood of Locomotive Engineers has been incorporated under the name of the Locomotive Engineers' Mutual Life & Accident Association. The President is A. B. Youngson, of Cleveland, O.

The judgment of $7,000 and costs against the New York, New Haven & Hartford Railroad for violating the New York State law forbidding the use of stoves in passenger cars has been confirmed by the Court of Appeals. This suit was entered soon after the collision in New York City February 20, 1891.

On April 23 a special train with a small party left Chicago for the Pacific Coast over the Atchison, Topeka & Santa Fe, and, according to press dispatches, arrived at Albuquerque, N. M., on the evening of the 24th. The distance is 1,377 miles, which is said to have been made at an average speed of 45 miles an hour.

It is reported from Roanoke, Va., that the Norfolk & Western has acceded to the demands of its conductors, engineers, firemen, brakemen and telegraph operators, and will not make the 10 per cent. reduction in pay that was ordered, but "the salaries of the men in the offices and at the machine works will remain at the old figures for the present."

The dynamite outrages in and around Lancaster, Pa., of which there were several a few weeks ago, have been renewed, an attack being made on the passenger station of the Pennslyvanin Railroad at Watts on April 24. On the former occasion the abutment of a bridge supporting the main track of the Pennsylvania Railroad was badly damaged by dynamite.

The Mobile & Ohio notified its firemen, conductors, brakemen and switchmen on April 10 that their wages would be reduced eight per cent. on the 1st of May, but three of the five organizations demand the stipulated time notice and the general manager has announced that the

reduction will not take effect unitl June 10, but he changes the 8 per cent to 10 per cent.

The question of rapid transit for Boston, which has been agitating the *Boston Herald* and some other people of that city for some time, has finally come to a vote in the State Legislative Committee, and the Meigs Elevated Railroad is favored, 10 to 4. This vote is understood to indicate that the scheme for an underground railroad, to be used by electric street cars, either under Tremont street or in a separate right of way between blocks, is regarded as impracticable or too costly for present adoption.

Judge Taft, in the United States Court, has refused to restrain Receiver Felton from reducing the wages of the employees of the Cincinnati Southern Railroad 10 per cent, as asked for by the employees. Judge Taft said: "The employees have no legal rights which are about to be iolated by the order complained of. Under the contract for their employment they are entitled to thirty days' notice of any reduciton in wages. That notice was given on March 27, and speaking from a strictly legal standpoint, they are now to be put in the attitude of either accepting or rejecting the proposition by the receiver to employ them at the reduced wages. If they are not content with the wages they are not compelled to accept them and mayr etire form ihs employment."

The new Richmond & Danville route between Florida and New York has broken its own record for high speed two or three times already, and on April 26 a special passenger train was run from Jacksonville to Jersey City, which is said to be just 1,000, miles in 24 hours and 25 minutes, or at the rate of 40.9 miles an hour. The reports state that 1 hour and 47 minutes was lost by stops, making the speed while in motion 44.2 miles an hour. The distance is stated as follows: Florida, Central & Peninsular, Jacksonville to Columbia, 282 miles; Richmond & Danville, Columbia to Washington, 489 miles; Pennslyvania, Washington to Jersey City, 228 miles. Two days later another train traversed the same route in 22 hours, equal to 45.5 miles an hour.

The Wheeling & Lake Erie and the Ohio Central Lines have ordered a reduction of pay rolls of 33 per cent., owing chiefly to the coal miners' strike. According to the press dispatches the saving will be made entirely by means of a reduction in the rates of pay and not by discharging or suspending men. It is reported that some reductions of pay have taken place among the trainmen on the Pennsylvania Railroad at Philadelphia. It is reported that the track repair laborers on the Pennsylvania Railroad south of Philadelphia who struck some time ago because their working hours were increased without an increase of pay have been promised their old rate after May 1, and it is said that they will at once resume work. The Maine Central has made further important reductions of train service. A press dispatch from Montreal says that the Grand Trunk, which reduced pay about 10 per cent. two or three weeks ago, has within the last three weeks dismissed 1,000 men from the repair department. The Fitchburg seems to have practically conceded the demand of the freight handlers at Boston. They will be paid $1.75 a day and work 10 hours.

Lake Notes.

The one satisfactory item in the news of the lakes is that there is about seven inches more water at St. Mary's Falls Canal than last year. The carriage of some 5,000,000 tons of iron ore has been contracted, but at very low rates. The coal strike, however, by preventing return cargoes and even threatening the supply of fuel, is keeping the boats from executing their contracts. It is hoped this will make business brisk and rates higher in the Fall.

The boats of the Lake Michigan & Lake Superior Transportation Line are to carry flour between Duluth and Benton Harbor, in connection with the Big Four Railroad, after leaving their package freight at Chicago. Hitherto this flour has gone via Detroit and Toledo.

The car ferry heretofore running for the Toledo, Ann Arbor & Northern Michigan between Frankfort and Kewannee, will shortly run to Menominee, which it is thought will offer better freights than Kewannee. Dock building is being pushed with energy and it is hoped to have arrangements made at Menominee so that the western terminus can be transferred to that place in two months.

A regular steamboat service has been started between Cleveland and Montreal. Stops will be made at Prescott,, Brockville and Toronto. The boats will discharge their freights directly into ocean steamers at Montreal.

South American Notes.

Mr. F. W. Barrow, General Manager of the Buenos Ayres Great Southern Railway, Argentine, who is now on leave of absence, will shortly visit the United States to investigate the methods in vogue here for long distance transportation of cattle.

The following officials have been appointed for the Transandine Railway, Argentine: Manager, Matias S. Sanchez; Secretary, B. Ruiz de los Llanos; Chief of Stores, Pablo Gollier; Chief of Ways and Works, Enrique Fonfoni; Inspector of Telegraphs, Carlos Manjocio; Chief of Traffic, Gaston Pagand.

The report of the Buenos Ayres & Rosari Railroad for 1893 shows gross earnings of $2,677,160, and expenses of $1,312,608, leaving a net income of $1,364,552. After deducting all fixed changes there results a balance of $100,646. This company intends during the present year to obtain an independent entrance into Buenos Ayres by a short detour of 3½ miles. It also expects to complete the Conchas branch.

The Railroads Council of Chili has been authorized to receive bids for 200 iron and 100 steel buffers, and 100 tons of steel sheets for springs.

Work on the Pichi-Ropulli to Union and Osorno (Chilian) Railroad, which will form part of the trunk line from Valparaiso to Puesto Montt, is progressing. The driving of piles across the marshes of the Rio Pilmaiquen is proceeding rapidly, and nine miles of track has been laid from Rio Bueno to the third bridge across the Rio Llollelhue.

Erie Track Elevation.

The Legislature of New Jersey has defeated the bill requiring the Erie to raise its tracks in Jersey City. The vote was 25 in favor of the bill to 34 against it. Inasmuch as the company has fenced all the crossings and provided gates and watchmen, and inasmuch as it is now struggling to live, to say nothing of investigating millions in improvements, it seems as if the Legislature could have done nothing else; and yet this is rather an unusual example of sanity.

The Oriental Express.

A new connection for the existing "oriental express" (Paris to Constantinople) will be established on the first of June. The new train will run from Ostend to Vienna, where it will consolidate with the existing train. This new train, like the one which is already running, will be what the Europeans call a "train de luxe," that is, it will have sleeping cars furnished by the "Waggon Lits" Company.

Panama Canal.

At a recent meeting in Paris the following resolution was adopted: The plenary meeting of the Panama bondholders, held at the Tivoli Vauxhall, on April 4, 1894, and at which 722,000 shares are represented, entrusts to a syndicate of five persons the mission of founding a new company for the completion of the inter-oceanic canal, and confers upon it for this purpose full power to make terms with the delegation and with the judicial representatives of the bondholders, and agrees to furnish as the first subscription toward the new company's capital the sum of 20,000,000 francs, to be subscribed proportionately by all the existing Panama committees, and to be deducted from the assets to be distributed among them.

The Lawrence Scientific School.

The Lawrence Scientific School, Harvard University, is just establishing courses in mining engineering and architecture, and it is the expectation to make them equal to anything of the kind in the country. The school has peculiar facilities for the architectural course, being able to draw on the university professors for a large amount of instruction. A course in science for teachers is also just being established, the purpose being to give special training to those who expect to teach the sciences. The courses in engineering in general are being somewhat remodeled and improved.

LOCOMOTIVE BUILDING.

The Rogers Locomotive & Machine Works, of Paterson, N.J., have received an order from Cuba for five eight-wheeled passenger locomotives, cylinders 18x24 in., and two switching locomotives, Forney type, cylinders, 16x24 in. The locomotives are to be delivered in October and November.

CAR BUILDING.

The Pullman Car Co. has secured the contract for the Baltimore & Ohio Southwestern cars, which has been talked about for a number of months. The exact number of cars included in the order is not given, but it is understood to be very nearly 1,000.

BRIDGE BUILDING.

Elkins, W. Va.—The town council of Elkins, W. Va., will let the contract, on May 3, for the erection of a 50 ft. steel bridge over Buffalo Run, a large creek that passes through the town.

Harrisburg, Pa.—On April 30 the county commissioners let to Nelson & Buchannan, Chambersburg, Pa., the contract for building iron bridges over Saxon Creek at Sycamore street, this city and at Londernilch's in East Hanover township. The former is a plate-girder with a 54-ft. span, while the latter is really an approach to the present bridge over Scratora Creek. Four bids were submitted as follows, the first figure being on the city structure: Shultz Bridge Co., $2,985, $9,975; F. A. Valkenburg $2900, $1,910; Pittsburg Bridge Co., $2950, $2099; Nelson & Buchanan, $2800, $1800.

Ocean Springs, Miss.—A company has been organized at Ocean Springs for the purpose of building a bridge across Fort Bayou. The company has an organized capital of $10,000. The following are the officers: Parker Earle, president; E. R. Bragg, secretary; Newcombe Clarke, treasurer.

Philadelphia, Pa.—Senator Cameron has introduced a bill authorizing the Pennsylvania & New Jersey Bridge Company to construct a railroad bridge across the Delaware River, between Philadelphia and Camden, N. J. The incorporators named in the bill include Charles H. Cramp, Thomas Dolan, A. J. Cassatt and ex-Senator W. J. Sewell.

Philadelphia.—The bridge appropriation of $846,000, has passed common councils and the Director of Public Works will award the contracts for the bridges included in the ordinance. This is similar to an ordinance which passed one branch of the common council, but was finally defeated, by the adjournment of the councils. The appropriation is to cover the cost of the following bridges among others: Over the Schuykill at the Falls, $300,000; Girard Avenue, over Pennsylvania Avenue, $28,000; Forty-ninth Street, over West Chester & Philadelphia Railroad, $25,000; Seventeenth Street, under connecting railroad, $50,000; Duval Street, under Wayne Street, $50,000; intersection of Sixth Street, and Alleghaney Avenue, over the Richmond branch of the Philadephia & Reading Railroad, $80,000; Torresdale Avenue, over Pennypack Creek, $60,000.

St. Louis, Mo.—The House committee on commerce has agreed to report favorably Representative Forman's bill for a bridge over the Mississippi river at St. Louis.

Elmira, N. Y.—A jury has recommended the erection of a $2500 iron bridge over Towainecin Creek in this county.

Norristown, Pa.—The contract for building an iron bridge across the Cowanesque river in Derfield township has been let to the Owego Bridge Co. for $4800. It will be 16 ft. wide and have one span of 157 ft.

At a stockholders' meeting on April 26, it was voted to increase the capital stock of the Elmira Bridge Co. from $100,000 to $125,000.

Waverly, N. Y.—The town board of commissioners of highways on April 25, granted the contract to the Owego Bridge company for $976 to build a 40 ft. iron span bridge across Ellis creek near Sulpher Springs.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Rome, Watertown & Ogdensburg, 1 1-4 per cent., payable May 15.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Alleghany Valley, annual, Philadelphia, Pa., May 7.
Burlington, Cedar Rapids & Northern, annual, Cedar Rapids, Ia., May 22.
Central of New Jersey, annual, Jersey City, N. J., May 11.
Dauphin & Berks, annual, Philadelphia, Pa., May 7.
Delaware & Hudson Canal, annual, New York City, May 8.
Duluth, South Shore & Atlantic, annual, Marquette, Mich., June 7.
Dutchess County, annual, Poughkeepsie, N. Y., May 7.
Missouri, Kansas & Texas, annual, Parsons, Kan., May 16.
New York & Harlem, annual, New York City, May 15.
Omaha & St. Louis, annual, Stanberry, Mo., May 15.
Philadelphia, Harrisburg & Pittsburgh, annual. Philadelphia, Pa., May 7.
Pittsburgh, Fort Wayne & Chicago, annual, Pittsburgh, Pa., May 16.
St. Louis, Alton & Terre Haute, annual, St. Louis, Mo., June 4.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The Master Car Builders' Association will hold its annual convention at Saratoga, N. Y., beginning June 12. The hotel headquarters will be at Congress Hall, H. S. Clements, Manager.

The Master Mechanics' Association will hold its annual convention at Saratoga, N. Y., beginning June 18.

The National Association of Local Freight Agents will hold its annual convention at Pittsburgh, Pa., June 12, 13, 14. The headquarters will be at the Monongahela House.

The Association of American Railway Accounting Officers will hold its next annual meeting at Willard Hall, Washington, D. C., commencing May 30.

The Western Railway Club meets in the rooms of the Central Traffic Association, Monadnock Building, Chicago, on the third Tuesday in each month, at 2 p. m.

The New York Railroad Club meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m.

The New England Railroad Club meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Wednesday of each month.

The Central Railway Club meets at the Hotel Iroquois, Buffalo, N. Y., on the fourth Wednesday of January, March, April, September and October.

The Southern and Southwestern Railway Club meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The Northwestern Railroad Club meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month at 8 p. m.

The Northwestern Track and Bridge Association meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2:30 p. m.

The American Society of Civil Engineers meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month at 8 p. m. The annual convention will be held at the Cataract House, Niagara Falls, N. Y., beginning June 20.

The Western Society of Engineers meets on the first Wednesday in each month, at 8 p. m. The headquarters of the society are at 51 Lakeside Building, Chicago.

The Engineers' Club of Philadelphia meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

The Boston Society of Civil Engineers meets at Wesleyan Hall, 36 Bromfield street, Boston, on the third Wednesday in each month at 7:30 p. m..

The Enginners' Club of St. Louis meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas Place, St. Louis, on the first and third Wednesdays in each month.

The Engineering Association of the South meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

The Engineers' Society of Western Pennsylvanin meets in the Carnegie Library Building, Allegheny, Pa., on the third Tuesday in each month, at 7:30 p. m.

The Technical Society of the Pacific coast meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The Association of Engineers of Virginia holds informal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at 8 p. m.

The Denver Society of Civil Engineers meets at 36 Jacobson Block, Denver, Col., on the second and fourth Tuesdays of each month except during July, August and December, when they are held on the second Tuesday only.

The Montana Society of Civil Engineers meets at Helena, Mont., on the third Saturday in each month, at 7:30 p. m.

The Engineers' Club of Minneapoils meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The Canadian Society of Civil Engineers meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday at 8 p. m.

The Civil Engineers' Club of Cleveland meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The Engineers' Club of Cincinnati meets at the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati, O., on the third Thursday in each month, at 7:30 p. m.

The Engineers' Club of Kansas City meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The Engineers' and Architects' Club of Louisville meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday in each month at 8 p. m.

The Civil Engineers' Society of St. Paul meets on the first Monday of each month.

The Scandinavian Engineering Society of Chicago meets in room 309, Title and Trust Building, 100 Washington street, on the third Thursday in each month.

The Foundrymen's Association meets at the Manufacturers' Club, Philadelphia, Pa., on the first Wednesday in each month.

Call for National Convention of Railroad Commissioners.

The sixth annual convention of the Railroad Commissioners has been called to meet at the office of the Inter-

state Commerce Commission, No. 1312 F street, Washington, on May 8, at 11 a. m. The Railroad Commissioners of all states, and state officers charged with any duty in the supervision of railroads, are invited to attend. The Association of American Railway Accounting Officers is also invited to attend or send delegates to the convention, and join in the consideration of such questions of special interest to their association as may arise. At the last convention committees were appointed on the following subjects and directed to report to the next convention: Railway Statistics; Abuses Caused by Use of Shippers' Cars in Railway Equipment; Pooling of Freights and Division of Earnings; Uniform Classification of Freights.

American Society of Civil Engineers.

At the meeting of Wednesday evening, May 2, the first paper read was by M. Meigs, M. Am. Soc. C. E., on "The Use of Canvas in Water-tight Bulkheads." The writer considers this method especially adapted to the following cases: The construction of coffer-dams, especially on rock bottom; the suppression of leaks in embankments, such as levees during high water, and the suppression of leaks in foundations, such as important reservoir dams. It has long been in use for raising sunken vessels on our Western rivers.

The U. S. Mississippi River Canal, at Keokuk, Ia., has been in operation since 1877. It has a lock at each end and one in the middle. In the fall of 1893 it became necessary to drain the lower lock and examine it, as it has been in use for 16 years. The filling and emptying culverts are 8 ft. wide and 16 ft. high, and there are 16 culvert gates 3 ft. wide and 6 ft. high. Each leaf of the lock gates is 27 ft. high and 46 ft. wide, and weighs 40 tons, and the leakage of the lower 10 ft. was becoming serious. About 40 ft. below the lower mitre sill there was a smooth rock bottom, and a bulkhead was erected, with its ends abutting against the flaring ashlar wing-walls of the lock approach. This constisted of 13 triangular bents of timber placed lengthwise of the canal and spaced 8 ft. apart, except the end ones, which were flared down stream. The face of the dam was given a slope of 1½ to 1, to secure greater downward pressure and prevent slipping. Purlines of 8 x 12-in. timbers, and light bracing, etc., were attached. After towing this framing to place, the whole was sunk by the use of 60,000 lbs. of old rails, and then closely covered with 3 x 12-in. planks. The timber was not mortised in any way, but fastened by cleats and other special attachments. As the bottom has been kept clean by the scour from the discharge culverts, the dam settled smoothly to place.

The canvas sheet used to give tightness to the apron, was of 12-oz. duck in two 10-ft. and one 6 ft. breadth, sewed together at the edges, and was about 4 ft. longer than the extreme length of the apron. A ½-in. iron chain was sewed to the lower edge to act as a sinker and make it hug the bottom, on which it lapped about 12 in.; it also extended some inches on the wing wall. It was spread by the diver, and cleats were nailed on the angle between the apron and the wing wall, also along the upper edge. When all was in readiness the lock was pumped dry in six hours. The tightness of the dam surprised everybody; all leakage could have been easily removed by a hand pump, but a pulsometer was used intermittently. Some anxiety was felt as to the effect of ice freezing fast to the canvas, for fear the rise and fall of the water would tear the canvas; but it froze fast to the planks beneath and there was no trouble.

The greatest head of water was 12 ft. An apron of poles would probably have sufficed for a support to the canvas. By using a wider lap on the bottom it might be used where the bottom was gravel. The total cost of the bulkhead was $1,159, from which $400 can be deducted for material saved.

The second paper was by Addison M. Scott, M. Am. Soc. C. E., "On the Great Kanawha Improvement, Tripping Bars and Improved Hurters on Chanoine Wicket Dams," etc. This paper is largely a discussion on the paper presented by F. Guillain on navigation works in France, presented at the Engineering Congress.

At the meeting to be held on Wednesday, May 16, the first paper is by Walter A. Gahagan, Assoc. M. Am. Soc. C. E., on "The Reconstruction of a Portion of the Substructure of the Johnsonville Bridge." This work (of which the writer was superintendent of Construction under Hunter McDonald, M. Am. Soc. C. E., Chief Engineer) consisted in the removal of three old piers and building two new ones for the portion of the bridge crossing the Tennessee River, on the Nashville, Chattanooga & St. Louis Railway, at Johnsville, Tenn.

The second paper for May 16 is by William Barclay Parsons, M. Am. Soc. C. E., on "A Failure of a Masonry and a Rock Foundation." About 15 miles east of Hornellsville, N. Y., on the line of the Central New York & Western Railroad, there is an iron viaduct, 700 ft. long and 235 ft. high, built in 1883. The tallest tower has two of its legs resting on piers, which stand in the bed of the stream. About five years ago these piers were found to be badly cracked and were encased in a jacket of concrete, 12 in. thick, but cracks continued to appear, and an investigation was made by the writer in 1893. One crack, 4 in. wide, extended from top to bottom, a height of 10 ft. The bottom and sides of the glen in which the pier was placed consisted of shale rock of various degrees of hardness. The concrete coating had been put on the piers down to and resting on the top surface of the shale, and this was badly eaten out so as to produce settlement and cracks. The first effort was to save the pier and concrete by excavating a trench in the rock around it, which was to be filled with concrete, but the jar in excavating brought down a large piece of the concrete jacket and showed the whole pier to be in an unsafe condition. The shale had decomposed underneath the pier, and an attempt had been made to shovel gravel underneath it. The stone composing the masonry were poor, and every stone was more or less cracked.

To support the tower during the removal of the pier, small plate girders 5 ft. long and 30 in. deep, were built, and fastened with turned bolts to the leg of the viaduct. The projecting ends of these rested on four 20-in. I beams, 18 ft. long, supported at their ends by cross timbers, V-shaped up stream, to render them safe in at each end. Stout cribs of old bridge timber were built to releive the Jacks case of high water.

As soon as the iron was removed clear of the pier, the masonry was removed, and it was found to be in a very bad condition. The vertical face joints, in many cases, were but 1 in. deep, the stones being triangularly shaped, with the bases outward. All was easily removed with a bar and shovel.

In making the repairs the shale rock was excavated for 3 ft. in depth, and 3 ft. outside of the lines of the new pier. It was laid up in Leroy limestone, which is hard and durable. The stones were carefully cut, with full joints, so that very little backing was required. The only difficulty in the work was in putting in the holding down bolts. To do this the bolts were placed through the pedestal stones from below, and the stone held up in place while the masonry underneath it was built up to it. The coping stones were so laid out so as to have the bolts pass through the joints. The cost of doing the work was $1,042.

The Central Railway Club.

This club held its last regular meeting of this season in Buffalo, April 25. The next meeting will be held in September. The discussion of Mr. Monford's paper on Terminal Yards, an abstract of which has already appeared in the *Railroad Gazette* was deferred until the September meeting, and members of the Buffalo Association of Railroad Superintendents will be especially invited to attend that meeting.

A special committee on the Rules of Interchange made a report. Correspondence with members had brought out a number of replies suggesting changes in Rules 3 and 8. The committee considered somewhat the subject of the wheel gage and concludes that a different form of gage is required and should be used in all shops in pressing on wheels. The committee thinks that not enough attention is paid to this very important matter. The specific recommendations of the committee as to changes in the rules of interchange were discussed and the report adopted with some amendments. The report and discussion will soon appear in full in the pamphlet published by the Club.

The Sixth International Congress on Interior Navigation.

The Sixth International Congress on Interior Navigation is to be held at The Hague during the coming summer. The American Society of Civil Engineers has been invited to participate and will accredit any of its members who desire to attend the Congress or to contribute papers or to enroll themselves for the purpose of receiving its publication. A brief synopsis of the programme for the work of the Congress follows.

Construction of Navigation Canals Affording Operation at High Speed.—Forms and dimensions of the canal section which will permit a boat of given immersed section to attain a desired speed with the least tractional effort. Necessary excess depth of the canal over draught of boats. Minimum radius to be adopted for canal curves. The most efficacious disposition and most economical construction for the protection of slopes and bermes.

Plant of Ports of Navigation.—Different systems of plant for ports. Advantages and disadvantages of these systems. Operating conditions. Economic results. Better arrangement of the connections between the railroads and the ports.

Means for Preventing Ice Blockades.—Different systems and methods for breaking and removing ice. Ice-breaking boats, explosive materials, etc. Results obtained. Price of construction of necessary apparatus. Expenses of operation.

Traction and Propulsion upon Canals, Canalized Rivers and Rivers of Natural Flow.—Progress made since the preceding Congress in the application of various systems of boat traction and propulsion. New systems invented or applied since then. Influence of the shape of boats and the condition of their surface on traction resistance. Speed necessary and attainable as well for cargo boats as for steamers and tugs with their tows.

Tolls on Navigable Ways.—Rates of tolls; influence of milage; of the tonnage of boats; of the nature, value and quantity of goods transported. Classification of freight. Exemption from, or moderation of, tolls on boats returning empty. Method of collection. Control. Additional toll for movement of locks, dams and bridges. Special extra charge for night service.

Relations Between the Configuration of Rivers and the depths of their channels.—Comparative study of the forms and depths of the principal water-courses, with tides and without, and with variable bottoms, concerning the following points: Correlation between curvature and depth; distance between points of greatest and least curvatures, and corresponding points of greatest and least depth (law of deflection). Application of the experimental graphic method based upon synoptic diagrams of curvatures and depths. Influence of width and discharge of rivers on the least depth in cases where curvatures are nearly equal. Influence of an alignment formed of straight lines and arcs of circles, compared with that constructed upon M. Fargue's system. Influence of high and low water on the channel depth at points of curve. Maximum sinuosity compatible with a continuous channel for different discharges and widths. Practical rules to be adopted for the choice of alignment and constitution of a low-water channel for non-tidal and tidal rivers.

Regulation of rivers at low water.—Influence exerted upon the current of a river by continuous longitudinal dikes, constructed so that at low water they enclose the entire river and remain slightly submerged. Possibility of regulating rivers by means of works designed to employ the total discharge in favor of navigation at low water.

PERSONAL.

—Mr. C. A. Skinner, Master Mechanic of the Mississippi Division of the Baltimore & Ohio Southwestern, has resigned.

—The nomination of Mr. James D. Yeomans to be Interstate Commerce Commissioner was confirmed by the United States Senate last week.

—Mr. G. J. Granner, formerly President of the Evansville & Terre Haute road has been appointed Assistant General Manager of the Chesapeake, Ohio & Southwestern, vice Mr. Epes Randolph, resigned.

—Mr. George A. Black, who has been an assistant engineer for the Main Central at Portland for the last six years, has been promoted to be Superintendent on the White Mountain division of the railroad, with headquarters at Lancaster, N. H.

Mr. W. A. Lore, assistant to the President of the Chicago Great Western, has resigned. Mr. Lore has been with the company for several years, and was prior to that time employed in the engineering departments of the St. Paul, Minneapolis & Manitoba and the Pennsylavnia companies.

—Mr. H. W. Gays, General Manager of the St. Louis Merchants Bridge & Terminal Co., has resigned that office on acciount of the joint operating agreement with the Terminal Railroad Association of St. Louis. Mr. Joseph Ramsey, Jr., General Manager of the latter company, will hereafter be General Manager of both companies.

—Mr. C. C. Merritt, of Duluth, one of the Merritt brothers who was the first to develop the Misaba iron range in Northern Minnesota, died at Duluth on April 20, being about 48 years of age. Mr. Merritt with his brothers built the Duluth, Misaba & Northern Railroad and was Treasurer of that company prior to the change of management last October, when the Merritt interest retired from the control of the property.

—Mr. Clarence H. Howard has returned to St. Louis after a trip of over two months, which included California, Mexico and the principal cities of Texas and other Southern States. Mr. Howard wants his friends to know that he will continue to reside in St. Louis, where he has lived for many years. He has taken apartments at the Beers Hotel, corner Grand avenue and Olive street. His office as Secretary of the Safety Car & Lighting Co. will be at the Union Trust Building, St. Louis.

—Mr. James Younger, Consulting Engineer of the Cramp Ship Building Works, at Chester, Pa., died suddenly at Germantown last week. Mr. Younger was born in Scotland, and after graduation at St. Andrew's College entered the shipyard of The Elders (now the Fairfield Co.) at Glasgow, and held a responsible position with that firm. In 1872 he came to the United States and at once entered the employ of the Cramps at Chester, and had been Consulting Engineer for that firm for a number of years.

—Mr. L. T. Myers, General Superintendent of the Seaboard Air Line, has resigned in order to accept a position with the Richmond, Fredericksburg & Potomac Railroad, of which his father, Major E. T. D. Myers, is president. Mr. Myers has been with the Seaboard Air Line system since 1885, for five years as Superintendent of Transportation, and since 1890 as General Superintendent. His first railroad work was with the Richmond, Fredericksburg & Potomac, with which he was connected between 1877 and 1881.

—Dr. Charles Macdonald, perhaps our readers think that they do not know the man, but they do. He is the Macdonald of the Union Bridge Co., Vice-President of the American Society of Civil Engineers, Trustee and past-President of the Engineers' Club, "Centurion," good fellow, able engineer, business man of the first rank, and now LL. D. Queen's University, of Kingston, Ont., has just given him the last title. We are told that the persons who supported him on the platform during the ordeal included the Earl of Aberdeen, Governor-General of Canada, and the President of the University of Toronto, but we think none the less of him for that. Dr. Macdonald, we salute you.

—Mr. L. S. Thorne, who has been General Superintendent of the Texas & Pacific road for two years, has been appointed General Manager. Mr. J. W. Everman has been appointed assistant general manager. Mr. Thorne is also Third Vice-President of the company. The general offices of General Superintendent and Assistant General Superintendent have been abolished. Mr. Thorne has been in the service of the Texas & Pacific since 1873, excepting for three years when he was with the Southern Pacific. He began work as brakeman and became Division Superintendent, Superintendent of Transportation, and, in May, 1892, General Superintendent, on the retirement of Col. John A. Grant. Mr. Everman has been with the company since 1880, and on Mr. Thorne's advancement to General Superintendent, Mr. Everman, who had been chief clerk for Mr. Thorne when he was Superintendent of Transportation, was promoted to be assistant Superintendent.

—Mr. Nicholas Monsarrat, vice-president and general manager of the Cleveland, Akron & Columbus road, has resigned those positions, and retires from the company's service after being connected with its management for 12 years. Mr. Monsarrat entered railroad service in 1872, as secretary of the Paducah & Memphis road. In 1873 he became general freight and ticket agent of the same road, and after two years was made secretary to the receiver. In July, 1877, he became general manager and served four years, when he became general superintendent of the Chesapeake, Ohio & Southwestern. After a few months in this position he was in December, 1881, chosen general superintendent of the Cleveland, Mt. Vernon & Delaware. In January, 1886, upon the reorganization of the road as the Cleveland, Akron & Columbus, he was elected president and general manager, which position he held until March 28, 1893, when Mr. George W. Saul was elected president, and Mr. Monsarrat became vice-president and general manager.

—Mr. Elbridge H. Beckler, M. Am. Soc. C. E., has opened an office as consulting civil engineer in the Monadnock building, Chicago, and is prepared to make reports, surveys and estimates on railroad, mining and irrigation work. Mr. Beckler, it will be remembered by most of our readers, was the chief engineer in charge of the location and construction of the Pacific extension of the Great Northern railroad. Mr. Beckler was educated in the Eastern States, but his engineering work has been entirely in the West, chiefly in Montana, Idaho and Washington, in which States he has had charge of some important railroad work. In 1880 he was with the Northern Pacific, and as resident engineer had charge of the section which included the Bozeman tunnel. Later he was on the Canadian Pacific on the construction of the Rocky Mountain section, and in 1886 became principal assistant engineer of the Montana Central, and about a year later Chief Engineer of that line, and had charge of its construction into Helena. In 1889 he was appointed to take charge of the surveys for the extension of the Great Northern line to the Pacific coast, and he remained in charge of that work until January, 1893, when the road had been completed to the Pacific coast.

ELECTIONS AND APPOINTMENTS.

Illinois Central.—J. S. Chambers has been appointed Master Mechanic at Clinton, Ill., with jurisdiction over the machinery department of the Springfield & Amboy divisions.

Chesapeake & Ohio.—H. E. Parker, formerly connected with the freight deparment, has been appointed Superintendent of Terminals at Newport News, Va., an office which has been recently created.

Wilkesbarre & Eastern.—W. H. Taylor, formerly connected with the engineering department of the New York, Susquehanna & Western, has been appointed Master Mechanic of this company at Stroudsburg, Pa.

Texas Pacific.—The offices of General Superintendent and Assistant General Superintendent of this road have been abolished. J. W. Everman has been appointed Assistant General Manager.

Central Ohio.—The annual meeting was held in Columbus, Ohio, on April 25 and the following directors were elected: James H. Collins, Columbus, Ohio; John R. Hall, Quaker City, Ohio; Joseph W. Jenkins, Joshua G. Harvey, W. B. Brooks and O. Latrobe, Baltimore; C. H. Kibler, Newark, Ohio; W. W. Peabody, Cincinnati; David Lee, Zanesville, Ohio; A. B Crane, Baltimore; Daniel C.

List, Wheeling, W. Va.; George E. Bradfield, Barnesville, Ohio, and John Hoge, Zanesville.

Grand Rapids & Indiana.—The annual meeting was held in Grand Rapids, Mich., on April 30, and the following officers were elected: First Vice-President anp treasurer, W. R. Shelby; Second Vice-President and General Manager, J. H. P. Hughart; General Counsel, T. J. O'Brien; Secretary and Auditor, F. A. Gorham. No President was elected to succeed W. M. Hughart, and W. R. Shelby will continue temporarily to act as President.

Baltimore & Annapolis Short Line.—The Annapolis & Baltimore Short Line, which has been in the possession of C. A. Coombs, receiver, has this day been reorganized as the Baltimore Annapolis Short Line, and the following officers have been elected: J. S. Ricker, president; J. Hopkins Smith, vice-president; L. A. Burck, secretary and treasurer; C. A. Coombs, general manager, and the following directors have been elected: J. S. Ricker, J. Hopkins Smith, George Burnham, Jr., W. W. Brown, C. A. Coombs, Sumner Wallace, F. C. Fennessy, B. F. Hayes.

Delaware & Hudson.—The following ticket for directors of the Delaware & Hudson Canal Co. will be voted by the proxy committee representing the majority of the present Board at the annual election next Tuesday, May 8: James Roosevelt, Robert M. Olyphant, William H. Tillinghast, Alfred Van Santvoord, James A. Roosevelt, Alexander E. Orr, Cornelius Vanderbilt, Chauncy M. Depew, John A. Stewart, James W. Alexander, James R. Taylor, Benjamin Brewster and Horace G. Young. The last five will take the place of Col. Le Grand B. Cannon, Johnston Livingston, R. Suydam Grant, B. H. Bristow and Samuel Spencer. Of the new pirectrs proposed, Mr. James R. Taylor served in that capacity from 1864 to 1888, and Mr. John A. Stewart, who is President of the United States Trust Co., retired two years ago in favor of Mr. Cornelius Vanderbilt. Mr. Alexander is President of the Equitable Life Assurance Society, and Mr. Young is now Second Vice-President and General Manager of the Delaware & Hudson. The Olyphant management has already received proxies for more than 193,000 out of a total of 300,000 shares.

RAILROAD CONSTRUCTION;

Incorporations, Surveys, Etc.

Allegheny & Monongahela.—This company was chartered at Harrisburg, Pa., April 30, to build a road from a point in Mifflin township to a point in Ohaca township, Allegheny County, the length of road being eight miles. William J. Hammond, of Pittsburg, is president, and the other directors are: William E. Tustin, Elliott Holbrook, James W. Patterson and Robert R. Hammond, all of Pittsburg.

Attica & Freedom.—F. H. Goodyear, of Buffalo, the well-known lumber dealer and one of the chief owners of the Buffalo & Susquehanna Railroad, is reported to have made a proposition to rebuild this railroad, change it to narrow gage and operate 30 miles of the road from Attica, N. Y., if the towns along the route will subscribe for $75,000 of the bonds to be issued to make these improvements. He places the total cost of the necessary improvements at $200,000.

Atlantic, Suwanee River & Gulf.—The track laying on the greater portion of the line between Stark and La Crosse, Fla., about 25 miles, has been begun under the direction of Arthur Meigs, of Jacksonville, Fla., the General Manager of the road. The grading on the extension beyond La Crosse to the Suwanee River is now going on. William Varnadoe has the contract for this extension, which will be about 35 miles long.

Bellefonte Central.—Another effort was made April 21 to have the line extended from State College to Pine Grove Mills, Pa., a distance of seven miles, a meeting being held at the former place, at which the company's officers offered to build the line if the citizens would secure the necessary rights of way.

Blaine & Eastern.—The contract has been let to Mr. J. Heney, of Whatcom, Wash., for the construction of 22 miles of the Blaine & Eastern from Blaine east to Lynden, Wash. B. T. Spencer, of Chicago, is the representative of the Eastern syndicate building the road, and John Elwood, a prominent business man of Blaine, negotiated the contract. The organizers of the Blaine & Eastern have guaranteed a large land subsidy, amounting to several thousand acres along the right of way.

Bloomville & Delhi.—This company will build a road from Bloomville to Delhi, N. Y. The ties are now on the grounds and will be laid this coming month. The route taken by this road covers the prettiest section of the Catskill Mountains.

Brazos & Burleson. —Thiscompany has been chartered in Texas with headquarters at Moseley's Ferry, in Brazos county. The incorporators are A. K. White, Miltin Parker, W. M. Koppe, J. W. Johnson, James A. Chance, W. J. Moore, T. R. Batte, W. W. Sims, R. S. Newsim, N. B. Cole, J. R. Catlton, W. G. Taliaferro and J. M. C. Chance.

Brooks Mills & Altoona.—This company filed a charter at Harrisburg, Pa., on April 27, with a capital stock of $375,000. It will build from near Brooks Mills, Blair county, to a point near Altoona. George B. Orlady, of Huntingdon, Pa., is President, and J. Murray Africa, S. Johnson, Frank W. Stewart, of Huntingdon; J. W. Fellows, Manchester, N. H.; G. A. Drew, Lewiston, Me.; G. M. Warren, Castine, Me., directors. Theodore Gerrish, of Portland, Me., holds 7,410 of the 7,500 shares.

Burlington & Missouri River.—The contractors have already begun the grading to the extension beyond Sheridan, Wy., to connect with the Northern Pacific at Billings, Mont., about 125 miles. Kilpatrick Brothers & Collins, of Lincoln, Neb., as reported last week, have the contract for building the line, and sub-contracts have already been let to W. S. Heckert, John Doolittle and Walsh & Reese. These sub-contractors report about 500 men engaged in the grading near Sheridan at present.

Burlington, Cedar Rapids & Northern.—Chief Engineer Whyte states that the company is not likely to do any new construction work this summer, and denies the recent reports that the proposed extension of the Forest City line will be undertaken this season. When the extension of this line beyond Forest City was begun in 1892 the surveys were made as far as Estherville, on the main line, but when the track was laid as far as Armstrong, 50 miles west of Forest City, in January, 1893, the construction work was suspended, although the line had been graded for some miles west of that point.

Chesapeake & Ohio.—This company has awarded to W. W. Boxley, of Greenbrier County, W. Va., the contract for filling in a high trestle about two miles in length and varying from 20 to 50 ft. in height, near Pawley's Creek, in Summers County, W. Va.

Columbus, Hocking Valley & Athens.—The Ohio Senate has passed the Fernhart bill which provides for abandoning the Hocking Valley & Athens Canal and leasing it to the Columbus, Hocking Valley & Athens Railroad for $6,030 a year. C. M. Poster of Columbus, Ohio, is one of the incorporators.

Delaware & Hudson Canal.—Some important improvements are being made on the Saratoga & Lake Champlain Division of this road. Between Port Henry and Port Kent the most extensive changes are being made. When the improvements between these stations are finished, the roadbed will have been practically rebuilt. Eighty-pound rails are to be laid, and on one day last week it was reported that over nine miles of the new track was laid.

Dry Fork.—Work on the grading and track-laying of this line is being pushed forward rapidly. At its session last week, the County Commissioners of Randolph County, W. Va., passed an order permitting the company to use the county roads for a roadbed, not only to cross, but to lay the tracks along the highways. The road is to be 35 miles in length, following the valley of Dry Fork of Cheat River all the way. It begins at Hendricks and will extend to Job, the center of a rich timber country of which the owners of the road own 80,000 acres. At present the timbering operations are carried on chiefly at Bretz, but when the road is completed the mills will be moved to the terminus of the line. R. F. Whitmer is President of the company, and Martin Lane, of Wilmington, Del., Secretary and Treasurer. The road starting at Hendricks, where Dry Fork River empties into Black Fork, follows the former, never getting out of sight of the stream. Five miles of the road is now completed and in operation, and beyond that point, for 15 miles the grading is going on.

Greenville & Northern.—The surveyors of the company have begun the survey for the intended extension from Greenfield to Clinton, Mo.

Green Bay, Winona & St. Paul.—Vice-President Walker, of New York, and other officers, have been making an inspection trip over this property, and have announced that a short branch to Waupaca, Wis., will be built, and that surveys are to commence this season. This line will be an extension of the existing branch which leaves the main line at Iola and reaches Scandinavia, Wis., Waupaca being a short distance north of the latter town.

Kensington & Tacony.—A new start has been made on the building of the Frankfort creek branch of the Kensington & Tacony road, which is operated by the Pennsylvania, which has been suspended since the tracks were laid as far as Margaretta street, in Frankford, some months ago.

Long Island.—Allison & Co., of New York City, have the contract for building an extension of this road from Port Jefferson to Wading River, about 12 miles. Port Jefferson is on the north side of Long Island and is the terminus of the Port Jefferson branch. The work is now in progress, the contractors employing 200 men at present.

Mann's Choice & Hyndmann Park.—This company was chartered in Pennsylvania last week, with the same officers as the Brooks Mill & Altoona road which was chartered at the same time. The road is to extend from a point near Mann's Choice, Bedford County, to Hyndman, a distance of 15 miles. Theodore Gerrish, of Portland, Me., holds 4,410 of the 4,500 shares.

Mahoning State Line.—The engineers of the Pittsburg & Lake Erie are now staking out the Mahoning State Line Railroad preparatory to construction, which will probably be begun within a month. It starts from the Ohio Iron & Steel Co.'s plant at Lowell, Ohio, and runs southeast five miles to the limestone region about Hillsville. J. A. Atwood, of Pittsburg, will have charge of the construction work as engineer.

Mexican International.—Press despatches from Eagle Pass, Tex., report that work will commence on the Monterly branch intersecting with the road at Espinazo, Mex., about 200 miles south of Eagle Pass, inside of 60 days. The deposits of lead and silver ore of Sierra Mojada and the mountain districts of Coahuila and Durango will have an unbroken railroad connection with the big smelters at Monterey upon the completion of this line. It is believed that on the completion of this branch, the line from Monclova to Sierra Mojada, which is already graded about 60 kilimeters, will be pushed to completion.

New Paltz & Highland.—This company was incorporated last year with a capital of nearly $190,000, the purpose being to construct a road from Highland to the town of New Paltz. Lately the company has purchased the right of way from the Highland Turnpike Company, and the work of laying ties will commence June 1.

New Roads.—Work was begun last week on a new narrow gage railroad between Pickens and Mayton, Webster county, W. Va., a distance of 12 miles. The road is to open a tract of timber land recently purchased by H. Calbach & Sons, of Lebanon, Pa., who are building the road. Two saw mills are to be built this summer to cut the timber. The road will be operated by steam power.

Connecticut capitalists are negotiating for a large tract of mineral and timber land on Clear Folk, in Tazewell County, Va., with a view of constructing a narrow-gauge line from some point on the Clinch Valley extension of the Norfolk Western and developing the property.

A contract has been let to John R. Deer of Duluth, Minn., for the building of 60 miles of railroad in Kentucky from the terminus of the Ohio & Big Sandy Railroad at Richardson, Ky., to the coal fields of Pike County.

Parsons Boom & Lumber Co.—The Parsons Boom and Lumber Co., of Parsons, Tucker County, W. Va., will, on May 1, begin the building of a standard gage railroad from Parsons, up Shaver's Fork of Cheat River, five miles to the Winchester timber lands recently purchased at that point. The road will be used chiefly for stocking the mills, but will also do a general traffic business.

Pittsburg & Lake Erie.—The proposed extension of the Pittsburg, McKeesport & Youghiogheny road from Bellevernon, Pa., which has been much talked of for some time, is not likely to be carried out this season as reported. The only foundation for the reports that the work is to be undertaken immediately is that the engineers are making a location from Bellevernon, south to and through Merchantsville, Pa., about seven miles. Nothing further than the staking out of the line is contemplated at present.

Rondout Valley.—This is the name of a new railroad company recently organized in Kingston N. Y. The company proposes to build a road this summer from Rondout to Ellenville, Ulster County, passing through Kingston, Stone Ridge, Marbletown, High Falls, Rochester and Ellenville. The cost of constructing this road will be over $250,000, of which $50,000 will be raised by subscription in the city of Kingston. Ex-Congressman Cox, of Ellenville, and Hon. Wm. Lounsbery, of Kingston, are the promoters of the proposed road.

Southern Pacific.—Colonel J. P. Hughes, the well known railroad contractor of Fort Worth, Tex., has been awarded the contract for laying 25 miles of rails on the Midland branch of the Southern Pacific, in Louisiana. This line leaves the main line at a point near Crowley, La. The road was graded by Colonel Hughes last winter, and now that the bridging has been completed he will start the work of laying rails at once.

Southern Pacific.—The coast extension south of Santa Margarita, Cal., was opened as far as San Louis Obispo on May 1. This section is about 20 miles long and has been several years in building. It includes the heaviest and greatest amount of tunnel work on the entire coast extension, there being seven tunnels of an aggregate length of 8,000 ft. between these two towns. About 100 miles of road remains to be built to complete the division to Ellwood, and give the Southern Pacific a coast line from Los Angeles to San Francisco. Very little construction work is being done now and the officers in San Francisco state that it is not certain how far the extension will be built this year.

Somerset & Bedford.—Articles of incorporation for this company were filed at Harrisburg, Pa., last week by the same incorporators as for the Mann's Choice & Hyndman, and the Brooks Mills & Altoona, for which charters were issued at the same time. The road proposed is to extend from Osterburg, Bedford County, to Ashtola, Somerset County, a distance of 15 miles. Theodore Gerrish, of Portland, Me., holds 5,810 of the 6,000 shares. The Huntington & Broad Top is believed to be interested in these three lines, which will reach coalfields and furnish western outlets for the company's product. One of them, the Mann's Choice & Hyndman, will parallel the Bedford division of the Pennsylvania and connect at the latter place with the Baltimore & Ohio. This would leave but 10 or 12 miles to construct from Mann's Choice to Mt. Dallas, the present terminus of the Huntingdon & Broad Top, and the objective point of the proposed extension from Richmond to the Cumberland Valley. The Brooks Mills line would also parallel a Pennsylvania branch.

Toledo & Ohio Central.—Work on the terminals at Columbus, O., has been suspended till the right of way over the tracks of the Columbus, Hocking Valley & Toledo, and Pennsylvania roads can be secured. Belt line work is also suspended entirely. It had got no further than to make surveys of several routes around the city.

Wilmington & Northern.—Five hundred men went to work this week on the new branch railroad which the Wilmington & Northern Co. is constructing from Spring field to Lancaster, Pa.

Williamsport & Binghamton.—Plans for reviving this long-talked of line are being discussed in the above named cities. In 1885 a charter was secured and subscriptions to the stock and rights of way obtained, but the road was never built. The route would be from Williamsport north on the Loyalsock to Dushore and thence by the State Line and Sullivan to Towanda, through Bradford and Susquehanna counties and from there to Binghamton.

Wheeling Bridge & Terminal Railway Co.—The extension from Wheeling to Benwood, W. Va., five miles, to reach the large iron works in the Ohio Valley, was completed last Thursday, and on Friday was formally inspected and accepted. The line as now completed extends to the Riverside Iron Works, and although much of it is built on piles and trestles, it is most substantially constructed. Receiver and President C. O. Brewster, of New York, Superintendant J. E. Taussig and Otto Schrall, Engineer of Maintenance of Way, made the inspection last week, and the first freight was delivered to the Riverside mill on Saturday.

Wiscasset & Quebec.—James McGregor, of Rumford Falls, Me., and Alexander McGregor, of New Brunswick, have a contract to grade 15 miles on the Wiscasset & Quebec Railroad and will begin work in May. The length of this line will be 54 miles and of this 46 miles has been located. The towns along the route are Wiscasset, on the coast, Alna, Whitefield, Windsor, China, Albion, Benton, Unity and Burnham. The gage is only 2 ft. George H. Crosby of Waterville, Me., the manager, has taken half of the stock, and the towns along the route have raised the balance. The officers are: George H. Crosby, President and General Manager; W. E. P. Fogg, Treasurer; N. Nickerson, Chief Engineer. The headquarters are at Wiscasset, Me.

GENERAL RAILROAD NEWS.

Baltimore & Annapolis Short Line.—The reorganization of the company was completed last week when the property bought at auction in January last was transferred to the Baltimorh & Annapolis Short Line. The new company will issue $600,000 50-years bonds bearing 3 per cent. interest for three years and 4 per cent. thereafter. Itwill also issue $500,000 of prefered stock and $400,000 of common stock. The directors have chosen the following officers: J. S. Ricker, of Portland, Me., President; J. Hopkins Smith, Vice-President; C. A. Coombs, of Baltimore, Managing Director, and L. A. Burck, Secretary and Treasurer.

Brainerd & Northern Minnesota.—Judge Russell in the District Court at Minneapolis on Saturday confirmed the sale of the road to the lumbermens' syndicate. The capitalization of the company is $500,000, and the price paid by the syndicate is $275,000. The present owners are Nelson, Tenney & Co., and other large lumber dealers of Minneapolis.

Chicago, Burlington & Quincy.—The statement of earnings for March makes the following comparisons:

MONTH OF MARCH.	1894.	1893.	Inc. or Dec.
Gross earn.	$2,719,855	$3,367,559	D $647,703
Open expen.	1,606,653	2,235,774	D 629,111
Net earn.	$1,113,202	$1,131,785	D $18,582
Fixed charges	800,000	822,880	D 22,880
Surplus	$313,202	$308,905	I $4,298
Three months to March 31.			
Gross earn.	$7,784,728	$9,402,088	D $1,617,359
Oper. Expen.	4,900,298	6,484,536	D 1,584,238
Net earn.	$2,884,430	$2,917,552	D $33,121
Fixed charges	2,400,000	2,468,642	D 68,642
Surplus	$484,430	$448,910	I $35,521
Dividend requirements	1,045,033	955,092	I 69,941

Chicago, Rock Island & Pacific.—In the suit of the company against the Union Pacific to recover rental under the somewhat famous contract between the two roads covering lines in the vcinity of Omaha, a jury in Judge McConnell's (Illinois circuit) court has rendered a verdict for the Rock Island for $85,481. Under the terms of the contract the Rock Island acquired trackage over the Union Pacific from Beatrice to Lincoln, Neb., and from South Omaha to Council Bluffs, and the Union Pacific acquired the same rights over the Rock Island from McPherson to Hutchinson, Kas., and from South Omaha to Lincoln. The Union Pacific used the Rock Island tracks between McPherson and Hutchinson during 1890, and to July 1, 1891, but did not use the tracks between South Omaha and Lincoln, but July 1, 1891, repudiated the contract and stopped paying rent. The Rock Island secured a decision in the United States Circuit Court at Omaha at that time, upholding the validity of the contract, and in July, 1892, commenced the suit which has just been decided demanding the rentals due under the contract from July 1, 1891, to July, 1892. The Union Pacific will appeal the case. In case the finding in the lower court is affirmed, the Rock Island will demand the payment of rental since July, 1892.

Eel River.—Judge Capron, of the Illinois Circuit Court, issued a decree last week declaring the lease of this road to the Wabash Railroad to be void on the grounds of "mismanagement and neglect." He announces that he will appoint a Receiver for the property on May 10.

Galveston, Houston & Henderson.—The suit of the Missoauri, Kansas & Texas against the International & Great oNrthern to oust the latter from control of she aboe named road is now being argued in the Texas Circuit Court at Houston, Tex. The litigation between these companies has been going on for some years and the main points of the dispute are pretty familiar to our readers. The Galeston, Houston & Northern was leased to the International &Great Northern in , when Mr. Jay Gould was presidenet of the Missouri Pacific systems, and the three roads were operated by that company. Alt the stock of the Galveston, Houston & Henderson is owned by the Missouri, Kansas & Txeas, but when the lease to the International & Great Northern was made it had no rail connection with the Galeston road. In 1891 it extended itsl line into Houston, and since then has been attempting to secure a modification iof the least to the International &Great oNrthern so that it could run its trains over the Galveston road to Galveston, Tex. The company made a contract with the officers of the latter road givng it this right, and it ran its trains into Galveston for a brief period until the DInternationaI & Great Northern secured an lnjunction, preentingit from continuing that agreement.

Jacksonville, Mayport & Pueblo.—C. S. Adams, of Jacksonille, Fla., was appointed receiver of this road by Judge Call at Jacksonville, Fla., last week in a suit brought by George F. Broughton.

Marietta & Northern Georgia.—The hearing of the application for the removal of Receiver Glover came up before Judge Newman in the United States court at Atlanta, Ga., on April 28. After argument the court ordered that the matter remain in statu quo until after May 8, at which time the road is advertised to be sold under foreclosure proceedings.

New York & New England.—The directors have adopted the plan of reorganization announced by the Reorganiztion Committee last week. The plan provides for an assessment of $20 a share on the common stock, with out compensation, and 25 per cent. on the preferred stock. The preferred stockholders will be given a bonus of 25 per cent. of the amount of their holdings in the new preferred stock. This new preferred stock will be enough in amount to raise the entire issue to $5,000,000, the limit authorized by law.

New five per cent. bonds to the amount of $17,500,000 are to be issued, $10,000,000 to retire the old first mortgage bonds. The old second mortgage bondholders are offered 40 per cent. of the amount of their bonds in cash and 60 per cent. in new five per cent. bonds. There will be $2,500,000 new bonds in the treasury for future requirements. The amount of cash raised by this arrangement will be nearly $5,000,000, the $4,000,000 obtained by the assessment on the $20,000,000 of common stock being underwritten by a guarantee syndicate.

Northern Pacific.—Judge Jenkins has appointed Alfred L. Carey, of Milwaukee, the special master to hear testimony in the three references made by Judge Jenkins to a special master on the charges brought by the present directors of the Nothern Pacific against Receiver Oakes. The hearing began in Chicago April 27. All the testimony on these references is to be heard within 40 days.

Pennsylvania, Lehigh & Eastern.—The franchises and property of this Pennsylvania corporation are to be sold at auction at Stroudsburg, Pa., on May 8. The project is for a railroad from Tomhickenn to Matamoras, in Pike County, Pa., where it is proposed to make connection with the roads leading to the Poughkeepsie bridge. Twelve miles of the line has been graded from the eastern or Matamoras end. The present foreclosure sale is at the instance of J. H. Perry, of Wilkesbarre, Pa., and other stockholders, and they propose to purchase the property, reorganize the company, and go ahead with the construction work.

Pennsylvania, Poughkeepsie & Boston.—The bondholders of the company have decided not to resist the foreclosure proceedings instituted at Trenton a few weeks ago by the Holland Trust Co., of New York, trustee for the first mortgage bonds. The bondholders' committee, of which William B. Scott is chairman, has suggested a plan for the protection of the bondholders' interest, providing for the formation of a syndicate and the creation of a fund of $375,000 with which to buy in the property under the sale. The indebtedness to be settled is about $335,000, including receivers' certificates, overdue interest on the same and unpaid interest on bonds. The plan provided further that a call of 20 per cent. in subscriptions should be made on the first and second mortgage bondholders.

Pittsburg Junction.—At last week's special meeting of stockholders in Pittsburg it was decided to issue $250,000 new stock and to also increase the bonds by a similar amount. The additional stock to be issued is to represent the earnings expended in betterments. The proceeds of the bonds are to be used to make further improvements.

St. Louis, Alton & Terra Haute.—The directors have called a meeting of the stockohlders for June 26 to vote on the question to issue new first mortgage for $2,500,000. hTe bonds are to run for 30 years, to bear 5 per cent. interest, and are to be issued to refund the present mortgage indebtedness of the road and to proide funds for the improement of the property.

TRAFFIC.

Traffic Notes.

The Vandalia line and the Chicago & West Michigan will run a summer sleeping car line between St. Louis, Mo., and Petoskey, Mich.

The Lehigh Valley has announced a reduction in the freight rate on anthracite coal, prepared sizes, from the mines to New York harbor on May 10, of 20 cents a ton. Pea coal, which is now 30 cents a ton less than the other sizes, will thus be only 10 cents a ton less.

The New York Legislature has passed the bill requiring the Manhattan Elevated Railroad (New York) to sell tickets through over its own line and that of the leased Suburban Rapid Transit road, which is an extension of the Second Avenue Manhattan Line northward to 177th street, at a single fare of five cents. The bill now awaits the Governor's approval.

The sharp competition for steerage passenger business between the different lines of Altantic steamships continues active, and it is reported that the continental lines will send steamers to Liverpool and take passengers in the steerage from there to New York at $14. The different lines will take turns in sending vessels to Liverpool, the North German -Lloyd, Hamburg-American, Netherlands-American and Red Star lines participating.

The New York Central announces that a 24-hour train, via the Lake Shore, will be put on between New York and Chicago on May 27. It will leave New York at 11 a. m., arriving in Chicago at 10, and returning it will leave Chicago at 5.30 p. m., and arrive in New York at 6.30. It will be remembered that the Exposition Flyer and the old Chicago Limited were both taken off last Fall. The train now restored is one hour faster than the Chicago Limited, but is five hours slower than the Exposition Flyer.

The Southern Pacific reports that the reduction in passenger fares during the rate war resulted in greatly increased business. InMarch there were 14,455 arrivals. in California from the East and 11,637 departures. The corresponding figures for 1893 were 15,606. For January and February this year, the movement was, respectiely, 11,679 and 12,279, in March was 14,455, against 8,037 in February, 8,858 in January, 8,441 in March, 1893. This indicates that the low rates brought about 6,000 people to California over the Southern Pacific lines alone, over and above the regular traffic.

Chicago Traffic Matters.

Chicago, May 2, 1894.

There is no change in the trans-continental passenger situation. Both sides are resting on their arms and maintaining their positions with dogged persistence. The Southern Pacific has during the past week made strong representations to the Western Passenger Association Committee that they are acting without right or authority in keeping in force the $16.10 rate; that through rates cannot be made in connection with its road without its consent; that the present course is injuring the Southern Pacific's intermediate business and that the Union Pacific threatens to turn all San Francisco business iva Portland and steamer; that it has a right to be heard and considered and afforded an opportunity to try and harmonize the situation; and proposing that a conference be held, and that pending the conference rates be restored. To this the Advisory Committee have replied that the only terms under which they will consent to a cessation of hositlities and a conference are that prior to such restoration and conference the Union Pacific place its immigrant business in the hands of the agent of the committee without reservation. If this is done they will restore rates and atrend a conference. Nothing has been heard from the Union Pacific.

Of course all sorts of rumors are current. Some profess to believe that the passenger department of the Union Pacific is acting under direction of the receivers with intent to further cripple the property; others attribute to it a desire to conserve revenues, but think that the course is ill-advised, as its representatives knew full well that the other lines would not stand the payment of excessive commissions. Meanwhile the immigrants are going forward on the $16.10 rate; the other lines are carrying them for nothing from the Missouri River to their connection with the Southern Pacific; and if the Union Pacific is paying commissions and receiving no aid from either of its connections it is out just so much on every immigrant it carries.

The Western connections of the Central Traffic lines have given notice to their eastern connections that they will no longer participate in terimnal and arbitrary deductions from the through rate from the Mississippi River made by Eastern lines, and that such deductions must be absorbed by the Eastern lines allowing to the Western lines a pro rata of the gross rate instead of the net rate as heretofore; that on frieght from the West bank of the Mississippi River and from points in Illinois when bridge toll is added to the through rates it is to be deducted from pro rating and accrue to the Western lines. The result of this will be to give the Western lines an average of ½ cent per 100 pounds, as their share of the through rate. The subject has been docketed for consideration by the Managers of the Eastern lines at their meeting May 4.

There is likely to be a repetition of last year's disturbance over rates on flour from Minneapolis and Duluth, caused by reductions in the agreed lake and rail rates via Duluth. Present rates from Minneapolis via Duluth are 20 cents per 100 pounds, as against an agreed rate of 22½ cents. The St. Paul-Chicago lines have not yet met these rates, but unless the situation rights itself before long, which does not now seem probalbe, they will meet the 20. cent rate via Chicago. Whether the fight against the trunk lines will be renewed this year or not is questionable. It is perfectly apparent that either the lake lines are carrying the flour for nothing or the trunk lines are pro rating with them on such rates as are made. Rumors were current last week that shipments had been taken form Minneapolis as low as 19 cents, but they are not confirmed; at least this rate has not been generally quoted. It would probably amount to nothing if the Chicago lines should attempt to get the trunk lines to decline to pro rate on any less than agreed rates from Minneapolis, as it is evident that some of the lines propose to continue the practice whether the Western Lines like it or not.

No further attempt will be made to make an agreement with the Soo Line, and lines via Chicago will meet the competition of the Northern line as best they may.

The Pennsylvania is now equalizing coal rates from Pennsylvania mines via Peoria to Western points with the Chicago rate by making the rate to Peoria $3.75 per gross ton

Efforts are being made through the State Railroad and Warehouse Commission to secure the adoption of the official classification from Chicago to such interior Illinois points as are affected by the official classification on shipments from Eastern jobbing centers. In some instances the difference in classification prohibits Chicago merchants from competing in their own State. The commission is seriously considering the making of an order to tha effect.

The Davenport Refining Company is protesting against recent action in the Western Freight Association with drawing glucose rates from all packages not plainly so marked. Complaint was made by some of the members that shippers of fancy brands of syrups were taking advantage of the commodity rate on glucose to ship goods of a much higher grade, but which contained a small percentage of glucose. Investigationproved such to be the case, and that shippers were taking advantage of the rates to ship a large quantity of syrups and drips which were commercially rated at a much higher price than glucose, and which were practically impossilbe of detection by the means ordinarily at the command of the carriers. The shippers claim that the fancy brands complained of are really about 85 per cent. glucose, but that to label them "glucose" would destroy a very profitable trade which has been established; that they have shipped in this way for many years and that a precedent has been established. In a circular letter on the sujbect, Chairman Midgley, among other things says:

"It is doubtless to be regretted that the practice of shipping under names that have, for dealers, acquired a commercial value has prevailed so long that those concerned believe they possess in such brands proprietary rights. It will hardly, however, be maintained that misrepresentation by mere usage becomes right. The railroad companies offered to transport at the commodity rate in effect on glucose packages which are branded as such, but they do not feel justified in longer receiving and forwarding at the glucose rate shipments which dealers admit have a higher value than attaches to plain glucose."

The Eastern freight and passenger situation appears to be as muddled as ever. From what can be learned here about the meeting in New York last week it seems that no progress was made there, and that the whole matter was again referred back to the managers of the Chicago roads for further action. In accordance with that resolution, Commissioner Blanchard, of the Central Traffic Association, has called a meeting for May 4 for the further consideration of the proposed agreements regarding eastbound freight and passenger traffic. No substantial progress has yet been made in securing the adoption of the $10,000 penalty contract. In the meantime, charges continue to be made that cuts are of frequent occurrence in nearly all commodities, but they are hard to trace. The eastbound movement of freight warrants the assnmption that concessions are being made everywhere, but there is traffic enough in sight to keep each road reasonably well satisfied, and the agents are not devoting much time to finding out what the other fellow is doing.

An attempt is again being made to secure the insertion in the Chicago rate sheet of short line rates between Chicago and San Francisco via St. Paul and Portland. The roads that have an outlet only via St. Paul are of course backing the Northern Pacific and Great Northern in the demand for short line rates, while all the roads which have direct lines are opposing it. As the situation now is, the Northern Pacific and Great Northern are tendering a basing rate of $52.40 from St. Paul to San Francisco, which results in a combination of locals from eastern points via St. Paul lower than the through rate.

Texas freight rates remain in a demoralized condition, with little prospect of improvement.

The Santa Fe has succeeded in getting the Chicago Association to reconsider its action and to authorize the insertion of the Santa Fe rates in the Chicago rate sheet.

The Rock Island announces that it will meet action taken by the Union Pacific and will make a round trip rate of $15 from the Missouri River to Denver for the National, Republican League, June 26. The other roads will meet the rate.

Grain rates advanced to 1¼ cents a bushel for corn, and 1⅛ cents for wheat to Buffalo on full cargoes, and much better figures on small lots. One line broke the agreed rate of 1½ cents and took one cargo at 1 cent, but otherwise rates have been maintained.

The shipments of eastbound freight, not including live stock, from Chicago, by all the lines for the week ending April 28 amounted to 57,289 tons, against 64,663 tons during the preceding week, a decrease of 7,374 tons, and against 60,333 tons for the corresponding week last year. The proportions carried by each road were:—

Roads.	W'k to April 28.		W'k to April 21.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central	7,680	13.4	7,539	11.7
Wabash	5,727	10.0	8,778	13.7
Lake Shore & Mich. South	8,244	14.4	8,339	12.8
Pitts., Ft. Wayne& Chicago.	6,127	10.7	5,795	8.9
Pitts., Cin., Chicago&St. L.	8,349	14.6	11,122	17.2
Baltimore & Ohio	2,854	5.0	2,532	3.9
Chicago & Grand Trunk	5,973	10.5	6,010	9.3
New York, Chic. & St. Louis	5,186	9.0	5,603	8.7
Chicago & Erie	5,320	9.2	7,388	11.4
C. C. C. & St. Louis	1,829	3.2	1,557	2.4
Totals	57,289	100.0	64,663	100.0

Of the above shipments, 3,363 tons were flour, 21,730 tons grain and mill stuffs, 9,488 tons cured meats, 12,527 tons dressed beef, 1,894 tons butter, 1,303 tons hides and 5,639 tons lumber. The three Vanderbilt lines carried 36.8 per cent., the two Pennsylvania lines, 25.3 per cent.; Lake lines carried 69,051 tons, against 85,192 tons last week. (*Other Chicago traffic news will be found on page 321.*)

Changes in Trunk Line Passenger Rates.

The Board of Rulings, composed of Commissioners Goddard and Farmer of the Trunk Linne Association and Blanchard and Donald of the Central Traffic Association, have made a ruling on differential rates, by which the through passenger fares between New York and Chicago will be adjusted more according to the speed of the trains and not so exclusively by the route. The question came up on the application of the Erie to be put on a parity with some of the other lines which offer equal facilities, but have been allowed greater differentials.

The Board orders that after June 1 no differential be allowed any line on passenger business sent over the Lake Shore & Michigan Southern or the Michigan Central. This will directly affect the Delaware, Lackawanna & Western, which has been allowed heretofore a differential of $3 without regard to its choice of a Western connection. It has been able to give excellent service between New York and Chicago by way of the connecting lines named on a $17 rate. It will now have to charge $20 for the same service. The fare on the Lehigh Valley's fast train which is run over the Grand Trunk from Suspension Bridge to Chicago is advanced $1 to $18. The fare on train No. 3 of the West Shore, running over the Nickel Plate, is also advanced $1 to $18.

No change is ordered in the rate of fare on trains 5 and 7 on the Erie, but the fare on other Erie trains is reduced to $17. No second-class tickets can be sold at rates lower than those mentioned on the trains named. Permission for their sale is not revoked where the Lake Shore or the Michigan Central is used as the Western connection.

Between New York and Cincinnati the Board directed an advance of $1 to $17, by the Baltimore & Ohio, and by the Chesapeake & Ohio.